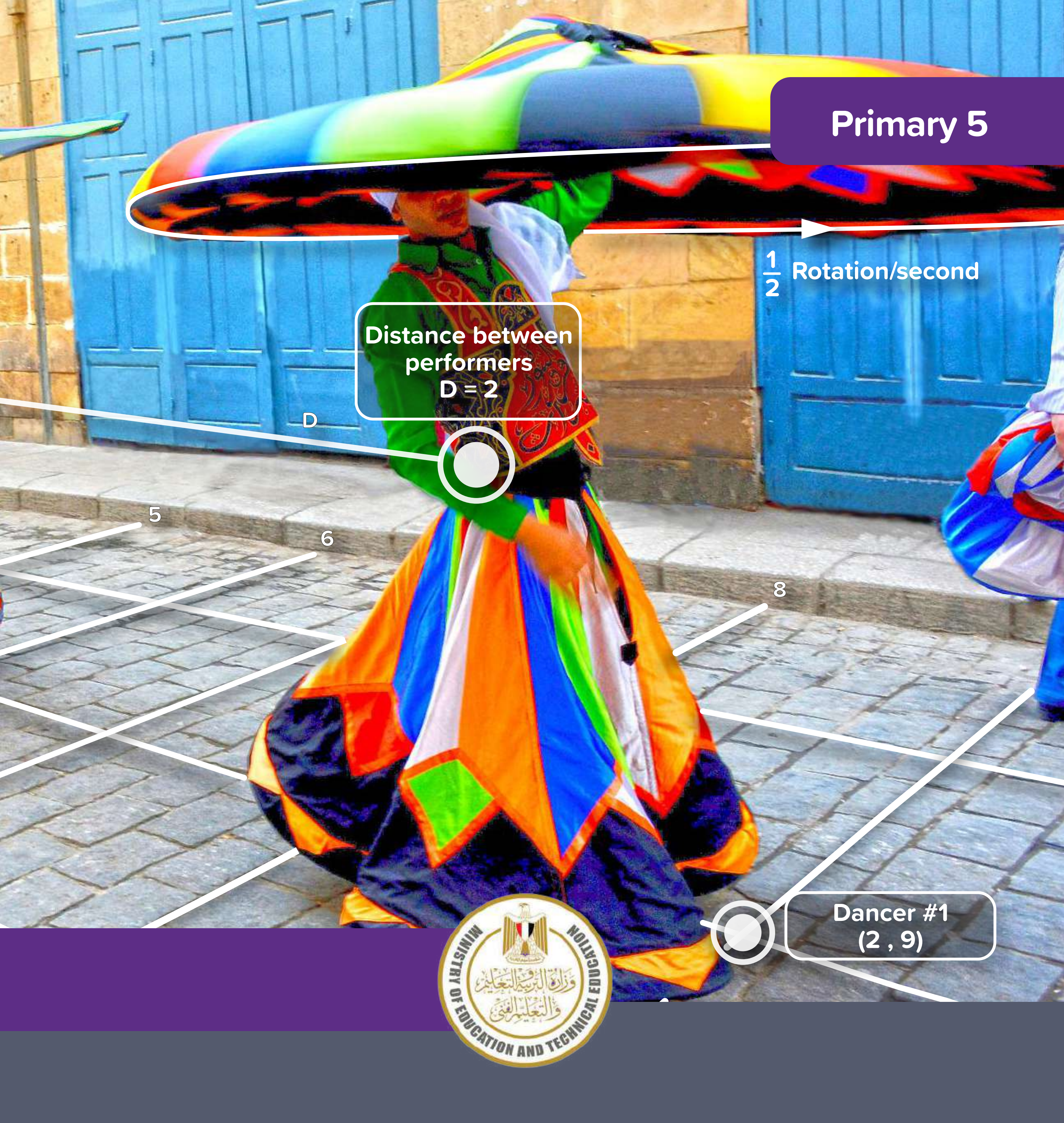

Primary 5
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Dancer #1
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MINISTRY OF EDUCATION AND TECHNICAL EDUCATION
وزارة التربية والتعليم والتعليم الفني

Math Term 1

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FOREWORD

This is a pivotal time in the history of the Ministry of Education and Technical Education (MOETE) in Egypt. We are embarking on the transformation of Egypt's K-12 education system. We started in September 2018 with the rollout of KG1, KG2, and Primary 1. In 2021 we rolled out Primary 4, and we will continue with the rollout until 2030. We are transforming the way in which students learn to prepare Egypt's youth to succeed in a future world that we cannot entirely imagine.

MOETE is very proud to present this new series of textbooks, with the accompanying digital learning materials that captures its vision of the transformation journey. This is the result of much consultation, much thought and a lot of work. We have drawn on the best expertise and experience from national and international organizations and education professionals to support us in translating our vision into an innovative national curriculum framework and exciting and inspiring print and digital learning materials.

The MOETE extends its deep appreciation to its own "Center for Curriculum and Instructional Materials Development" (CCIMD) and specifically, the CCIMD Director and her amazing team. MOETE is also very grateful to the minister's senior advisors and to our partners including "Discovery Education," "National Geographic Learning" "Nahdet Masr," "Longman Egypt," UNICEF, UNESCO, and WB, who, collectively, supported the development of Egypt's national curriculum framework. I also thank the Egyptian Faculty of Education professors who participated in reviewing the national curriculum framework. Finally, I thank each and every MOETE administrator in all MOETE sectors as well as the MOETE subject counselors who participated in the process.

This transformation of Egypt's education system would not have been possible without the significant support of Egypt's current president, His Excellency President Abdel Fattah el-Sisi. Overhauling the education system is part of the president's vision of "rebuilding the Egyptian citizen" and it is closely coordinated with the ministries of Higher Education & Scientific Research, Culture, and Youth & Sports. Education 2.0 is only a part in a bigger national effort to propel Egypt to the ranks of developed countries and to ensure a great future to all of its citizens.

WORDS FROM THE MINISTER OF EDUCATION & TECHNICAL EDUCATION

It is my great pleasure to celebrate this extraordinary moment in the history of Egypt where we continue to launch a new education system designed to prepare a new Egyptian citizen proud of his Egyptian, Arab, and African roots—a new citizen who is innovative, a critical thinker, able to understand and accept differences, competent in knowledge and life skills, able to learn for life and able to compete globally.

Egypt chose to invest in its new generations through building a transformative and modern education system consistent with international quality benchmarks. The new education system is designed to help our children and grandchildren enjoy a better future and to propel Egypt to the ranks of advanced countries in the near future.

The fulfillment of the Egyptian dream of transformation is indeed a joint responsibility among all of us; governmental institutions, parents, civil society, private sector and media. Here, I would like to acknowledge the critical role of our beloved teachers who are the role models for our children and who are the cornerstone of the intended transformation.

I ask every one of us to join hands towards this noble goal of transforming Egypt through education in order to restore Egyptian excellence, leadership and great civilization.

My warmest regards to our children who will begin this journey and my deepest respect and gratitude to our great teachers.

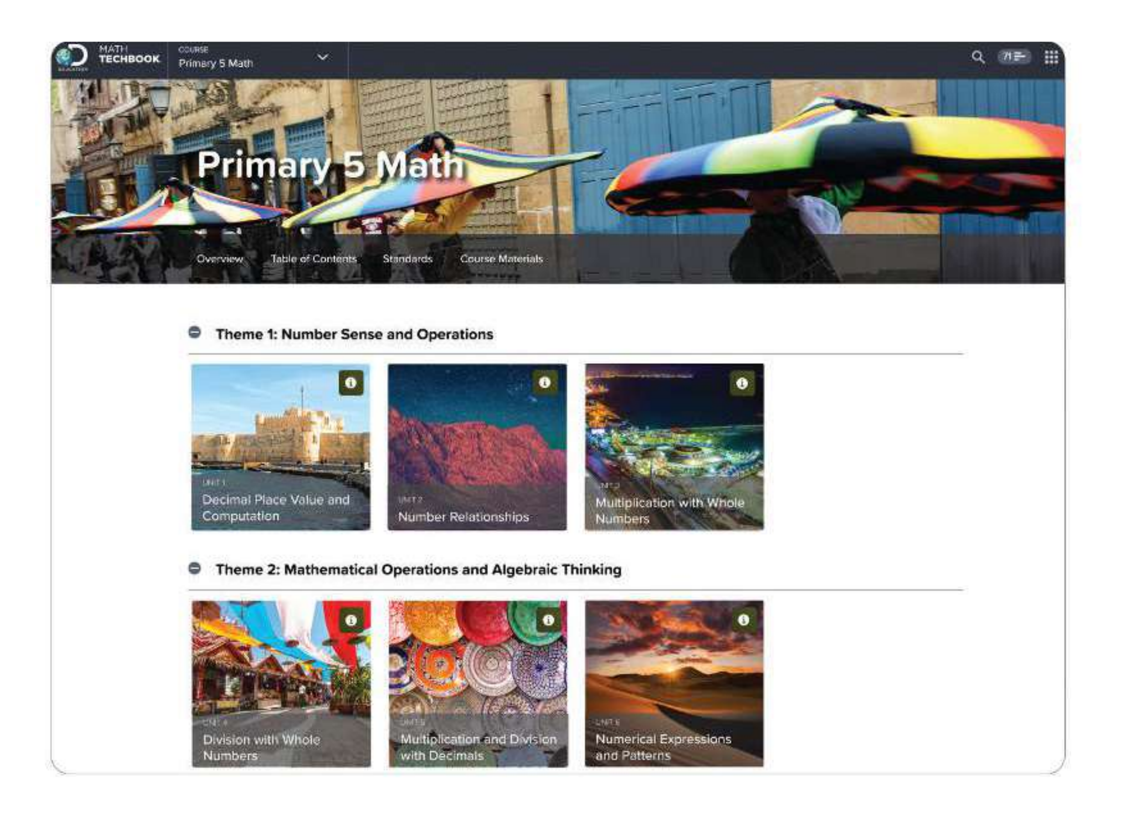
Dr. Tarek Galal Shawki

Minister of Education & Technical Education



Dear Parent/Guardian,

Welcome to Primary 5 Mathematics Techbook™! This comprehensive program inspires students to make sense of the world around them and to think and act like mathematicians. Throughout the digital and print program, students learn to reason mathematically, communicate using mathematical language, ask meaningful questions, solve complex problems, and work collaboratively with peers.



Primary 5 Mathematics Techbook was designed and written to teach to the Ministry of Education and Technical Education (MOETE) Primary 5 mathematics standards. The structure of Primary 5 Mathematics Techbook represents the Ministry's shifts in the Framework for Education 2.0, specifically focusing on accessing new and prior knowledge, building contextual understanding and procedural fluency, and making connections across mathematics to support application of skills and concepts. To help students make sense of mathematical content, the program also integrates a thematic approach and a variety of real-world scenarios.

Dear Parent/Guardian, *continued*

Primary 5 Mathematics Techbook challenges students to build on what they learned in previous grades, applying concepts and skills in new ways. Students also learn new and complex concepts and skills that prepare them for the challenges of Primary 6 and beyond. Primary 5 students assume greater responsibility for their own learning and are encouraged to seek opportunities to apply the mathematics they are learning in the world around them.

The major work of Primary 5 includes multiplication and division of whole numbers, fractions, mixed numbers, and decimals, as well as numerical expressions. Students also explore patterns, coordinate planes, and pie charts. Although these may seem like separate topics, students investigate and apply patterns and relationships among the topics to build a deeper understanding of each. They explore relationships between fractions and decimals, connect their understanding of two-dimensional figures to coordinate grids, apply the inverse relationship between multiplication and division, and draw parallels between fractions, decimals, and pie charts. Students learn to think like mathematicians as they notice patterns and rules, persevere to solve challenging problems, represent and explain their thinking, model their solutions, and strive for accuracy.

To inspire and motivate learning and curiosity, Primary 5 Mathematics Techbook features clear and engaging text, videos, digital tools, and Hands-On Activities. Hands-On Activities require students to investigate patterns and rules in mathematics and challenge them to communicate using mathematical language and models. The program also engages students in many kinds of writing and asks them to explain their reasoning and support their thinking using words, numbers, pictures, and symbols. When students engage in rich tasks that access prior knowledge and build reasoning, it is easier for them to make connections to the real world and to other mathematical learning.



Primary 5 Mathematics Techbook is divided into units. Each unit is divided into concepts, and each concept is divided into lessons. Each lesson has three main sections: ACCESS, BUILD, and CONNECT.

ACCESS Students activate their prior knowledge and begin to develop and express mathematical language.

BUILD Students focus on communicating their understanding, reasoning, evidence, and mathematical strategies.

CONNECT Students build deep conceptual understanding and a strong foundation for accessing knowledge in future lessons.

In addition, **WRAP-UP**, **PRACTICE**, and **CHECK YOUR UNDERSTANDING** features allow students to demonstrate their learning either verbally or in writing.

Within this Student Edition, you will find QR codes and Quick Codes that take you and your student to a corresponding section of Primary 5 Mathematics Techbook online.

We encourage you to support your student in using the print and online interactive materials on any device. Together, may you and your student enjoy a fantastic year of mathematics.

Sincerely,

The Math Team

UNIT

1

Theme 1 | Number Sense and Operations

Unit 1

Decimal Place Value and Computation



Place Value Planning

Photo Credit: krechet / Shutterstock.com

Unit Video Questions


Quick Code egm5001

The Unit 1 Opener Video, Place Value Planning, explores math around Egypt through decimals. In this unit, you will investigate place value patterns and relationships. You will learn strategies to estimate sums and differences as well as add and subtract whole numbers and decimals.

- ☐ How did decimals help the students make sense of the world around them?
- ☐ What did the students find out about decimals and place value?



LESSON 1

Decimals to the Thousandths Place



Learning Targets

- I can read decimal numbers to the **Thousandths** place.
- I can write decimal numbers to the Thousandths place.

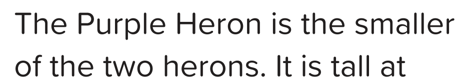
ACCESS

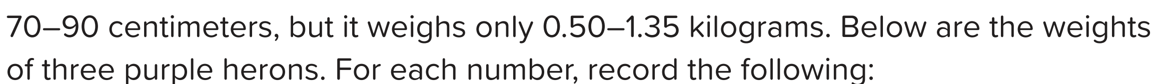
Birds of the Fayoum Basin Read the passage, and then solve the problem.

Fayoum is a very popular bird-watching destination in Egypt. Birds migrate to the basin for the plants and waters of Qarun Lake. Qarun Lake is the largest saltwater lake in Egypt and one of the oldest natural lakes in the world. Some of the birds that can be seen at Qarun Lake are little grebes, grey herons, purple herons, little egrets, and great egrets.



Purple Heron





The Purple Heron is the smaller of the two herons. It is tall at 70–90 centimeters, but it weighs only 0.50–1.35 kilograms. Below are the weights of three purple herons. For each number, record the following:



A. the digit that is in the Tenths place

B. the digit that is in the Ones place

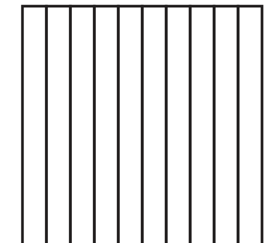
C. the digit that is in the Hundredths place

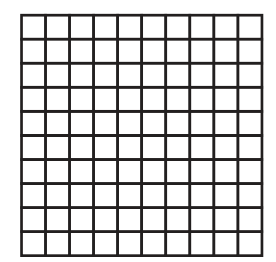
Bird One: 0.65 kilogram
Bird Two: 1.27 kilograms
Bird Three: 0.875 kilogram

BUILD

Plotting Out a City for a Thousand Read the problem and share your thinking with a Shoulder Partner.

Akram, a city planner, has two large square plots of land that were the same size. The first plot is divided into 10 equal plots of land for residents. The second one is divided into 100 equal plots of land. Then, Akram learns he must plan another square plot that has 1,000 equal pieces. How can he use the plot that is divided into 10 or the plot divided into 100 to make sure he has 1,000 equal parts? On which plot of land would you rather live? Why?



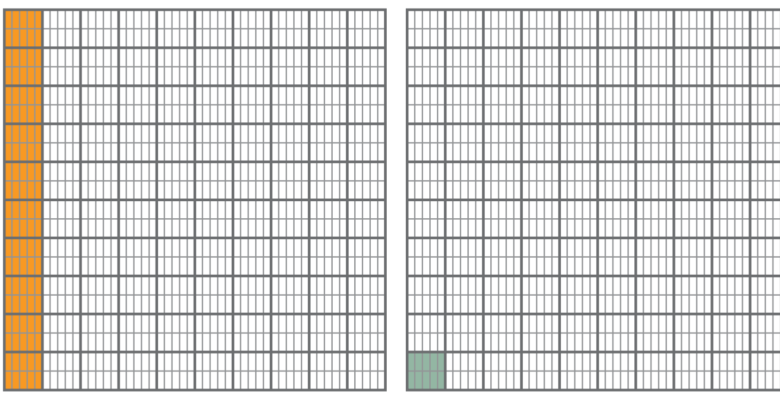


Spin a Decimal Practice modeling, reading, and writing decimals to the Thousandths.

Directions:

1. Select three colors: one for Tenths, one for Hundredths, and one for Thousandths.
2. Your teacher will spin a number for each decimal place. Shade in a grid to model the numbers your teacher spins. Be sure each decimal value is a different color.
3. Record the final decimal that the model represents. Compare your work with a partner and practice saying the decimal.

4. Repeat with a new grid.



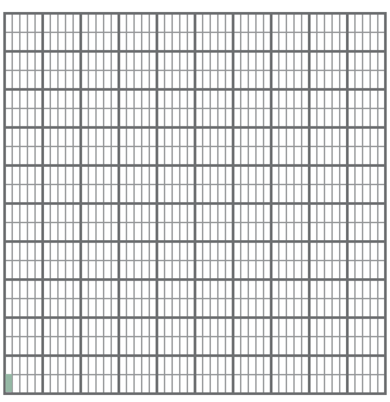
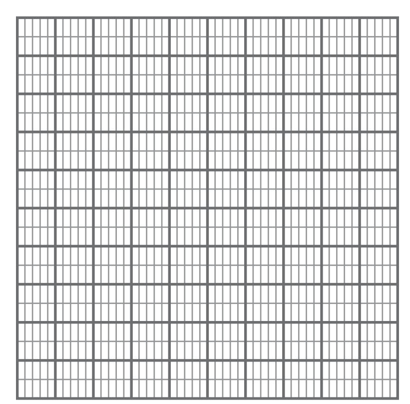
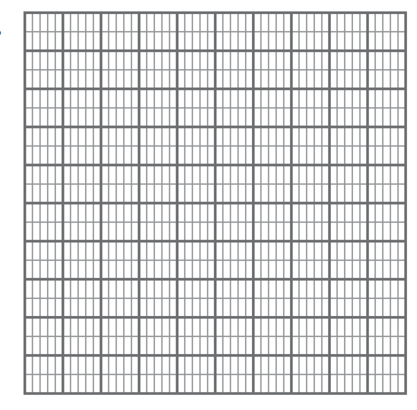


Photo Credit: Don Mammoser / Shutterstock.com

1.



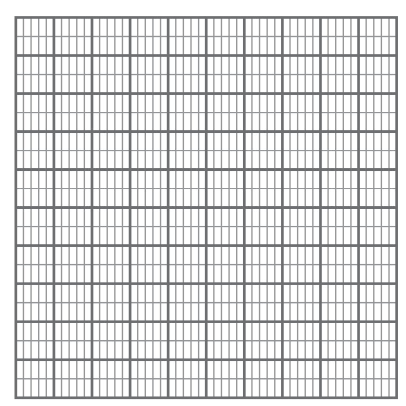
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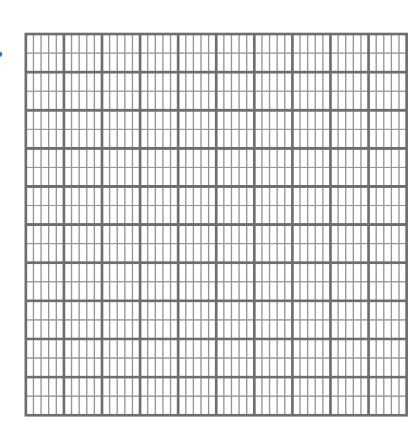


__________ Tenths __________ Hundredths __________ Thousandths.

__________ Tenths __________ Hundredths __________ Thousandths

0. __________ 0. __________

3. 

4. 

_______ Tenths _______ Hundredths _______ Thousandths.

_______ Tenths _______ Hundredths _______ Thousandths

0. _______ 0. _______

CONNECT

Math around Egypt: Gas Price Decimals Look at the list of different petrol prices in Egypt. Take turns with your Shoulder Partner reading each of the petrol prices aloud.

Gas Prices per Liter, April 2021

80 Octane petrol: 6.75 LE
92 Octane petrol: 8.00 LE
95 Octane petrol: 9.00 LE

1. Which type of petrol is the least expensive?
2. Which type of petrol is the most expensive?



Check Your Understanding

Follow your teacher's instructions to complete this activity.

LESSON 2

Place Value Shuffle



Learning Target

- I can explain how a digit changes value as it moves to the left or right in a decimal or whole number.

ACCESS

Which Number Fits Which? Read the categories describing data about Wadi El Rayan protected National Park in Fayoum. Decide which value best represents each category.

Categories	Values
1. Population	A. 112
2. Approximate square kilometers of Wadi El Rayan, a protected National Park	B. 30
3. Kilometers from Cairo	C. 3,615
4. Average Temperature in Celsius in the summer	D. 1,800

Photo Credit: Don Mammoser / Shutterstock.com

BUILD

Place Value Shuffle Talk with a partner about the questions. Be prepared to discuss your ideas with the class.

1. What would 3,615 become if it Multiplied by 10?

2. What expression could we write to represent this?

3. What is the relationship between the whole number 3,615 increasing by a factor of 10 ($3,615 \times 10$) and each digit within that number?

Decimals to the Thousandths Place

Ten Is a Powerful Number Use the place value charts to solve each problem. Fill in the blanks to show how the value of each digit also changed. An example is shown.

Example: $57 \times 10 =$

Thousands	Ones			•	Decimals	
O	H	T	O	•	Tenths	Hundredths
		5	7	•	0	0
	5	7	0	•	0	0

The value of the whole number increased by a factor of 10.

The value of the 5 increased by a factor of 10 from 50 to 500.

The value of the 7 increased by a factor of 10 from 7 to 70.

1. $57 \div 10 =$

Thousands	Ones			•	Decimals	
O	H	T	O	•	Tenths	Hundredths

2. The value of the whole number ______________ (increased/decreased) by a factor of 10.

   The value of the ______________ (first digit) ______________ (increased/decreased) by a factor of 10 from ______________ to ______________.

   The value of the ____________________ (second digit) ____________________ (increased/decreased) by a factor of 10 from ______________ to ______________.

3. $6.5 \times 10 =$

Thousands	Ones			•	Decimals	
O	H	T	O	•	Tenths	Hundredths

4. The value of the whole number ______________ (increased/decreased) by a factor of 10.

The value of the ______________ (first digit) ______________ (increased/decreased) by a factor of 10 from ______________ to ______________.

The value of the ______________ (second digit) ______________ (increased/decreased) by a factor of 10 from ______________ to ______________.

Photo Credit: Don Mammoser / Shutterstock.com

5. $345 \div 10 =$

Thousands	Ones			•	Decimals	
O	H	T	O	•	Tenths	Hundredths

6. The value of the whole number ______________ (increased/decreased) by a factor of 10.

The value of the ______________ (first digit) ______________ (increased/decreased) by a factor of 10 from ______________ to ______________.

The value of the ______________ (second digit) ______________ (increased/decreased) by a factor of 10 from ______________ to ______________.

The value of the ______________ (third digit) ______________ (increased/decreased) by a factor of 10 from ______________ to ______________.

CONNECT

Writing About Math Respond to the questions.

1. What did you notice about the relationship between the value of the entire number and the value of each digit as you multiplied and divided by 10?
2. What patterns exist in our place value number system?
3. What do you think happens if you move a number two places to the left? Use examples to show what you mean.



Check Your Understanding

Follow your teacher's instructions to complete this activity.

LESSON 3

Composing and Decomposing Decimals



Learning Target

- I can **compose** and **decompose** decimals in multiple ways.

ACCESS

Daylight in Fayoum Use the bar graph to help you answer the questions.

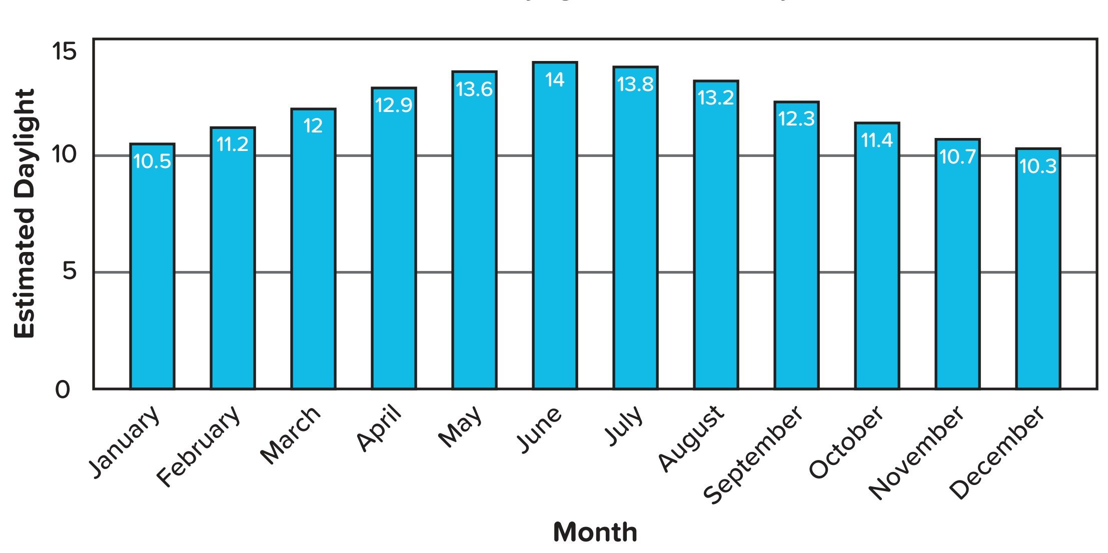


Photo Credit: Don Mammoser / Shutterstock.com

1. You want to visit Fayoum for 5 months to gather data to create a map. Which five months have the most daylight?
2. Which month has a 5 in the Tenths place?
3. Which month has the most daylight?
4. Which months have 3s in the Ones place?
5. Which month has the least daylight?

BUILD

Decomposing Decimal Numbers Work with your teacher to find multiple ways to compose and decompose 12.42.

Thousands	Ones			•	Decimals	
O	H	T	O	•	Tenths	Hundredths
		1	2	•	4	2

$$10 + 2 + 0.4 + 0.02$$

How else could 12.42 be decomposed? Record your ideas.

Partner Practice For each problem, record the number in the place value chart. Work with your partner to decompose the number in expanded form and then in two other ways.

1. 34.527

Thousands	Ones			•	Decimals		
O	H	T	O	•	Tenths	Hundredths	Thousandths

2. 1st way (expanded form): ____________________

   2nd way: ____________________

   3rd way: ____________________

Photo Credit: Don Mammoser / Shutterstock.com

3. 21.045

Thousands	Ones			•	Decimals		
O	H	T	O	•	Tenths	Hundredths	Thousandths

4. 1st way (expanded form): ____________________

2nd way: ____________________

3rd way: ____________________

5. 14.932

Thousands	Ones			•	Decimals		
O	H	T	O	•	Tenths	Hundredths	Thousandths

6. 1st way (expanded form): ____________________

2nd way: ____________________

3rd way: ____________________

7. 231.128

Thousands	Ones			•	Decimals		
O	H	T	O	•	Tenths	Hundredths	Thousandths

8. 1st way (expanded form): ______________________________

2nd way: ______________________________

3rd way: ______________________________

9. 508.17

Thousands	Ones			•	Decimals		
O	H	T	O	•	Tenths	Hundredths	Thousandths

10. 1st way (expanded form): ______________________________

2nd way: ______________________________

3rd way: ______________________________

Photo Credit: Don Mammoser / Shutterstock.com

CONNECT

Record the Weather Read and respond to the questions.

Samir and Tahani recorded January's daily temperature in Fayoum. Their data said the approximate temperature for the month of January was 16.3°C.

Tahani said this temperature was "Sixteen and three tenths degrees Celsius." Samir read this temperature as "Sixteen and thirty hundredths degrees Celsius."

Who is correct? How do you know? What other ways could you write 16.3°C in standard form using what you know about decimal place value?



Check Your Understanding

Follow your teacher's instructions to complete this activity.

LESSON 4

Comparing Decimals

Learning Target

- I can compare decimals to the Thousandths place.



ACCESS

Comparing Temperatures at the Basin At the Fayoum Basin temperatures vary greatly. The numbers are the temperatures recorded on one day in May. All numbers are in degrees Celsius. Compare each set of numbers using the symbols (> , < or =):

1. 29.9° _____ 30.2°
2. 36.5° _____ 35.6°
3. 40.5° _____ 41.0°
4. 35.2° _____ 34.7°
5. 38.80° _____ 38.8°
6. What strategy did you use to compare the temperatures?

Photo Credit: Don Mammoser / Shutterstock.com

BUILD

Comparing Decimals Compare the decimal numbers using the symbols for greater than (>), less than (<), or equal to (=). Draw a place value table to help you, if needed.

1. 45.057 _____ 45.100

2. 98.013 _____ 98.101

3. 50.009 _____ 50.100

4. 10.1 _____ 10.011

5. 2.01 _____ 2.099

6. 34.5 _____ 34.500

7. Select the largest number:

   1.401 1.341 1.440 1.055 1.3 1.30 1.28 1.49

8. Select the smallest number:

   20.09 20.1 20.001 20.011 20.10 20.010 20.9 20.21

CONNECT

Writing About Math Reflect on your learning about comparing decimals and answer the questions.

1. Give an example of two decimal numbers where the number with more decimal digits is smaller than the other number.
2. Give an example of two decimal numbers where the number with more decimal digits is equal to the other number.
3. What rule or rules could you create to help other students compare decimal numbers?



Check Your Understanding

Follow your teacher's instructions to complete this activity.

LESSON 5

Rounding Decimals



Learning Target

- I can **round** numbers to the nearest Tenth, Hundredth, or Thousandth.

ACCESS

Waterfall Region: Error Analysis Read about the Wadi El Rayan lakes and waterfalls. Then, complete the error analysis problem.

Southwest of Fayoum City is a region called the Valley of Wadi El Rayan. This region has two man-made lakes.

Water first reached the upper lake, which had an area of 50.90 square kilometers. Then, a stream flowed from the lake down through a deeper part of the basin and formed another lake with an area of 62.00 square kilometers.

A student wants to round the area of the upper lake to the nearest whole number. He rounds 50.90 square kilometers to 50.00 square kilometers.

Wadi El Rayan Waterfall

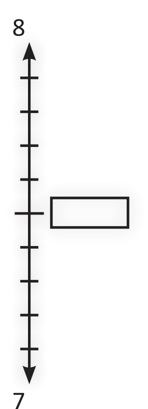


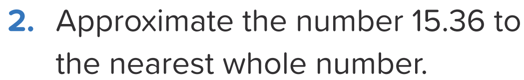
Photo Credit: Don Mammoser / Shutterstock.com

1. What did the student do correctly?
2. What did the student do incorrectly? Why do you think he made this error?
3. Try to solve the problem correctly. Explain your thinking.

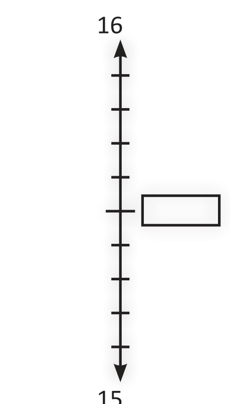
BUILD

1. Approximate the number 7.7 to the nearest unit.



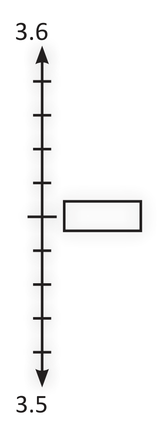


2. Approximate the number 15.36 to the nearest whole number.

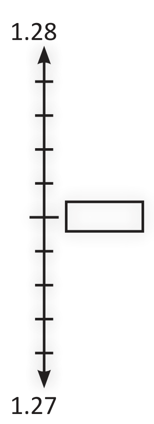


Round and Round Label the midpoint of the number lines. Place the given decimal number at its proper location.

3. Round 3.54 to the nearest Tenth.

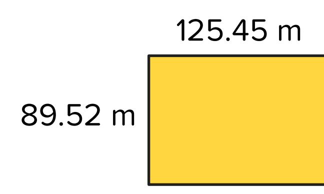


4. Round 1.277 to the nearest Hundredth.



Strategic Rounding Solve these problems using either the midpoint or Rounding Rule strategy.

1. A farmer is building a new fence for her sheep field. She wants to build a fence around the whole field. Estimate how much fencing you think she will need by rounding each dimension to the nearest Tenth. Explain your thinking.



2. Mazen is planning a trip from Cairo to the waterfall region in Wadi El Rayan. He will travel 147.72 kilometers. Round the distance to the nearest Tenth.

3. Mazen stops to have a snack and stretch after driving 73.255 kilometers. Round the distance to the nearest Hundredth.

4. Fill in the chart as you round the decimal to the stated place value.

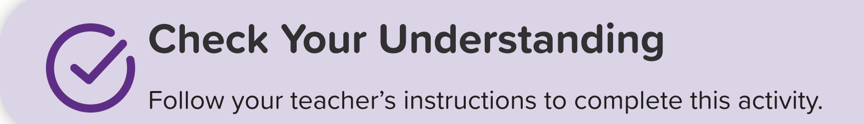
Number	Round to the nearest whole number	Round to the nearest Tenth	Round to the nearest Hundredth
56.284			

CONNECT

Math around Egypt: Waterfalls Read the passage, and then answer the question.

There are several cascades along the stream between the two lakes in Wadi El Rayan. The distance between the falls is approximately 30–35 meters, and the width of the island dividing the cascades is between 20 and 50 meters.

A geologist measured the exact distance between two of the falls at 31.45 meters and between two others at 36.921 meters. If both distances were rounded to the nearest whole number, would they fall into the range given in the passage? Explain your thinking.



Check Your Understanding

Follow your teacher's instructions to complete this activity.

LESSON 6

Estimating Decimal Sums



Learning Target

- I can **estimate** **sums** of decimal numbers.

ACCESS

Getting Close to a Whole Respond to the prompts with as many ideas as you can. Be prepared to share your ideas.

1. List some numbers that are close to one, but less than a whole.
2. List some numbers that are not close to one and are less than a whole.

BUILD

Easy Numbers Work with your teacher to practice using **benchmark** numbers to estimate.

Estimate Amounts Estimate the sum. Be prepared to share how you estimated and why you chose that way.

$2.361 + 3.783$

Estimate: ____________

Partner Practice You and your partner will work on estimating one problem at a time. Do not tell your partner your estimation strategy. When you are each done, compare and discuss your strategies and estimates.

Estimation Strategies (Try to use as many as you can.)		
Front-End Estimation Round to Ones	Benchmark Decimals Round to Tenths	Separate Wholes and Parts Round to Hundredths

1. $3.451 + 8.091$

   Estimate: ____________

2. $9.98 + 4.56$

   Estimate: ____________

3. $4.981 + 5.019$

   Estimate: ____________

4. Samar wanted to ride her bike 40 kilometers this week. By Thursday she had ridden 34.99 kilometers. On Friday she rode 4.01 kilometers. Estimate to see if she has met her goal.

   Estimate: ____________

5. Taha has 54.20 LE. His brother has 45.75 LE. They want to combine their money to purchase a box of apples for 100 LE. Estimate to see if they have enough money.

   Estimate: ____________

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Photo Credit: (a) Sergei25 / Shutterstock.com, (b) Linda Harms / Shutterstock.com



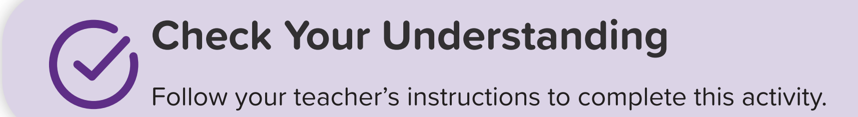
CONNECT

Math around Egypt: The Shadoof

If a farmer can lift 94.635 liters of water a minute in his shadoof, about how many liters can he lift in 4 minutes?



Shadoof



Check Your Understanding

Follow your teacher's instructions to complete this activity.

LESSON 7

Modeling Decimal Addition

Learning Target

- I can model decimal addition.

ACCESS

The Nile River Read the passage and respond to the question.

The Nile is the longest river in the world. The Nile flows north more than 6,650 kilometers into the Mediterranean Sea, and 95 percent of Egyptians live within a few kilometers of the river. The Nile has two main tributaries: The White Nile and the Blue Nile that flow into the river. and they meet each other in Khartoum .

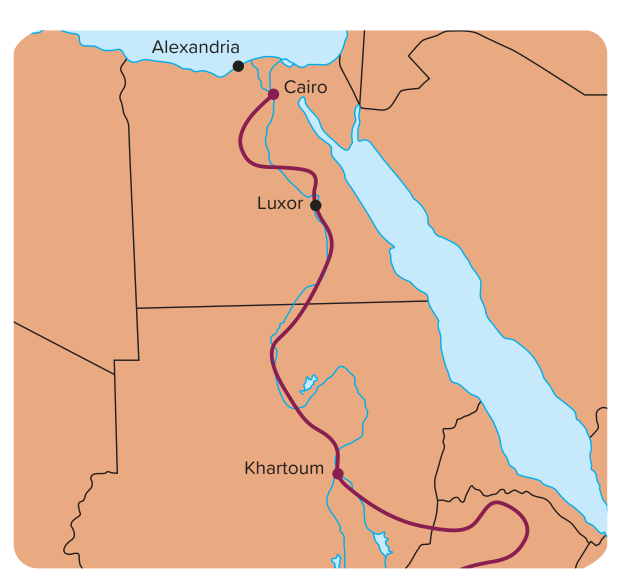


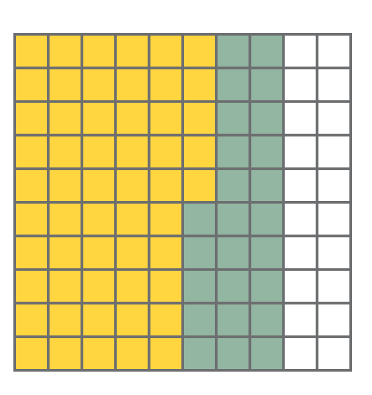
Photo Credit: Sergei25 / Shutterstock.com

Photo Credit: Sergei25 / Shutterstock.com

You are traveling from where the Nile River meets the Mediterranean Sea to the confluence of the Blue and White Nile in Khartoum. This is a distance of 2,406.69 kilometers.

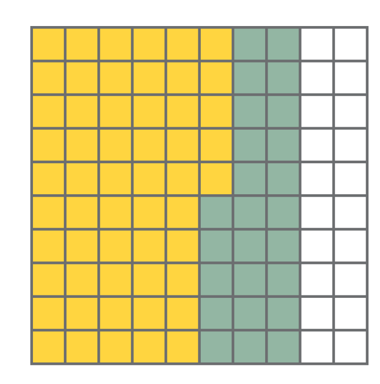
1. Round 2,406.69 to the nearest Thousand.
2. Round 2,406.69 to the nearest Hundred.
3. Round 2,406.69 to the nearest One.
4. Round 2,406.69 to the nearest Tenth.

BUILD



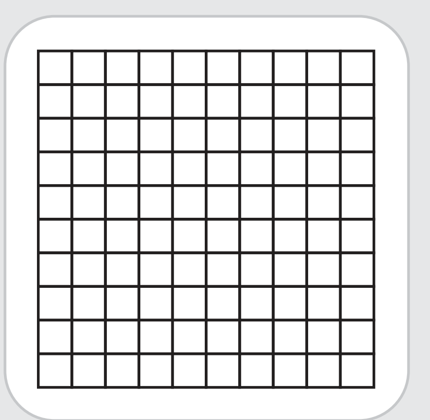
A Model Decimal There are two decimal numbers in the decimal model. One number is represented in yellow and the other is represented in green. Record the decimal numbers in the place value chart.

Thousands	Ones			•	Decimals	
O	H	T	O	•	Tenths	Hundredths



Express the Model Write an expression to match the model.

______ + ______



Whiteboard: Make a Model Pick a two-digit decimal number. Create a model of it. Record your partner's decimal number on your model (be sure to use a different color).

Photo Credit: Sergei25 / Shutterstock.com

Photo Credit: (a) Sergei25 / Shutterstock.com, (b) RussieseO / Shutterstock.com

Record Decimals Record the two decimal numbers in the place value chart.

Thousands	Ones			•	Decimals	
O	H	T	O	•	Tenths	Hundredths

Decimal Addition Write an addition sentence using the decimal numbers chosen by you and your partner.

__________ + __________ = __________

Model Makers Follow the directions to complete the problem.

Estimate: $0.13 + 0.23$ __________

Whiteboard: Modeling Use two different colors to create a model of the expression $0.13 + 0.23$.

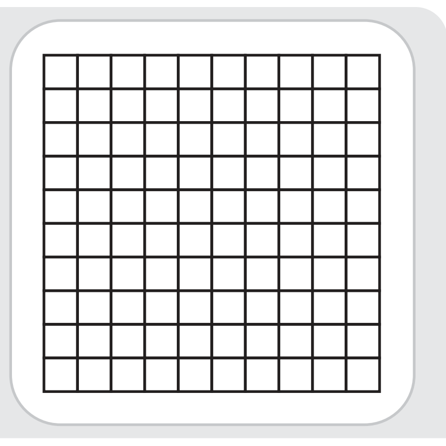


Photo Credit: Sergei25 / Shutterstock.com

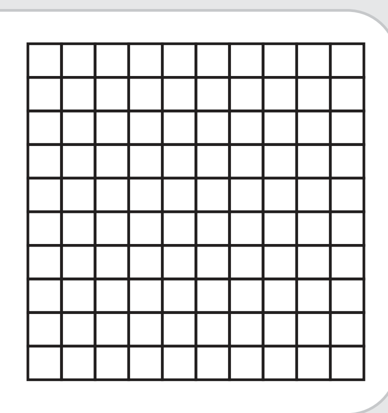
More Model Makers Follow the directions to complete the problems.

1. Record 0.13 and 0.23 in the place value chart.

Thousands	Ones			•	Decimals	
O	H	T	O	•	Tenths	Hundredths

2. Evaluate: $0.13 + 0.23 =$ __________
3. Estimate: $0.97 + 0.42$ __________

Whiteboard: Model Addition Use two different colors to create a model of the expression 0.97 + 0.42.



Evaluate More Follow the directions to complete the problems.

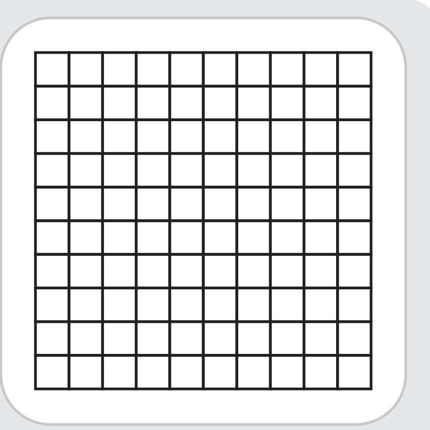
1. Record 0.97 and 0.42 in the place value chart.

Thousands	Ones			•	Decimals	
O	H	T	O	•	Tenths	Hundredths

2. Evaluate: 0.97 + 0.42 = ____________

3. Estimate: 0.05 + 0.05 ____________

Whiteboard: Model the Expression Use two different colors to create a model of the expression 0.05 + 0.05.



Solve Follow the directions to complete the problems.

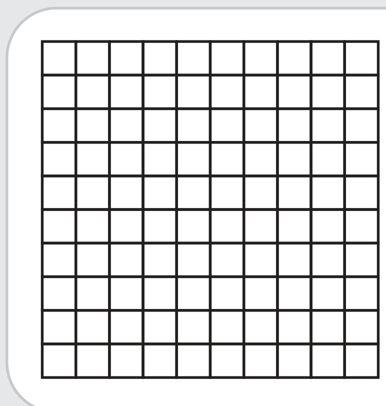
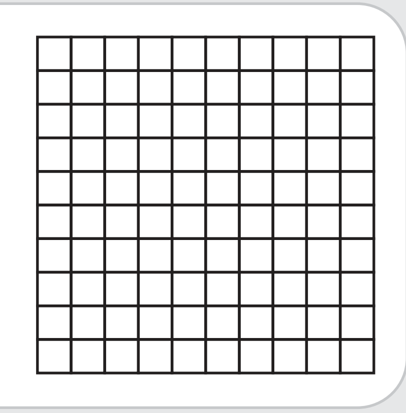
1. Record 0.05 and 0.05 in the place value chart.

Thousands	Ones			•	Decimals	
O	H	T	O	•	Tenths	Hundredths

2. Evaluate: $0.05 + 0.05 =$ ______

3. Estimate: $0.45 + 0.84$ ______

Whiteboard: Model Another Expression Use two different colors to create a model of the expression $0.45 + 0.84$.

Evaluate and Estimate Follow the directions to complete the problems.

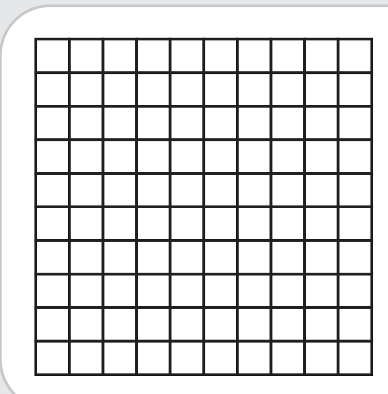
1. Record 0.45 and 0.84 in the place value chart.

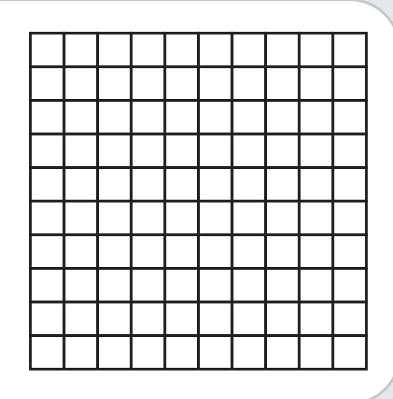
Thousands	Ones			•	Decimals	
O	H	T	O	•	Tenths	Hundredths

2. Evaluate: 0.45 + 0.84 = ______________

3. Estimate the sum: 0.92 + 0.89 ______________

Whiteboard: Model the Expression Again Use two different colors to create a model of the expression 0.92 + 0.89.





Evaluate Again Follow the directions to complete the problems.

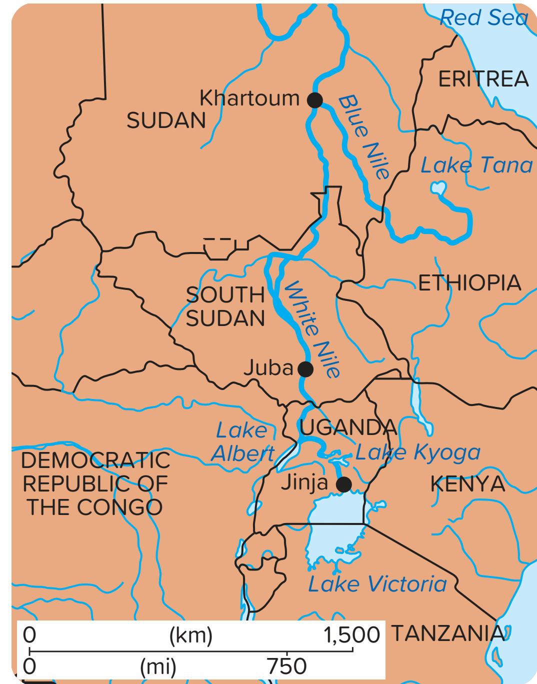
1. Record 0.92 and 0.89 in the place value chart.

Thousands	Ones			•	Decimals	
O	H	T	O	•	Tenths	Hundredths

2. Evaluate: 0.92 + 0.89 = ______________

CONNECT

Math around Egypt: The Source of the White Nile Read the passage, and then respond to the questions.



You will now travel from Khartoum to Juba in South Sudan to see the source of the White Nile. This trip is 1,941.2 kilometers. Juba is also on the bank of the White Nile. From Juba, you will travel on to Jinja, Uganda. It is a distance of 687.9 kilometers. Jinga is locatad near the source of the White Nile. How long is your journey from Khartoum to Jinja?

1. Copy the place value chart and record the addends.



Thousands	Ones			•	Decimals		
O	H	T	O	•	Tenths	Hundredths	Thousandths

2. Write and solve an addition equation using the two decimal numbers.

__________ + __________ = __________



Check Your Understanding

Follow your teacher's instructions to complete this activity.



LESSON 8
Modeling Decimals Subtraction

Learning Target

- I can model decimal subtraction.



ACCESS



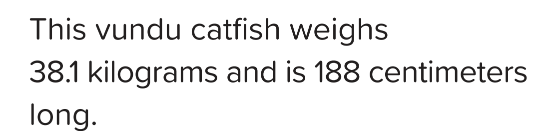
Nile Perch

Fishing in the Nile Valley: Error Analysis Read the paragraph and complete the error analysis.

Egyptians catch fish from the Nile River and its lakes, such as Lake Nasser in which many types of fish live in it.

This Nile perch is 110 centimeters long and more than 5 years old. It weighs 113.39 kilograms.

This vundu catfish weighs 38.1 kilograms and is 188 centimeters long.





Vundu Catfish

Wafaa wants to know the total mass of both the vundu catfish and the Nile perch example from the article. She decides to use the algorithm for addition. Here is Wafaa's work:

$$\begin{array}{r} {}^{1\,1} \\ 113.39 \\ +\quad 38.1 \\ \hline 117.20 \end{array}$$

1. What did Wafaa do correctly?
2. What did Wafaa do incorrectly? Why do you think she made this error?
3. Try to solve the problem correctly.

Photo Credit: Sergei25 / Shutterstock.com

4. BUILD

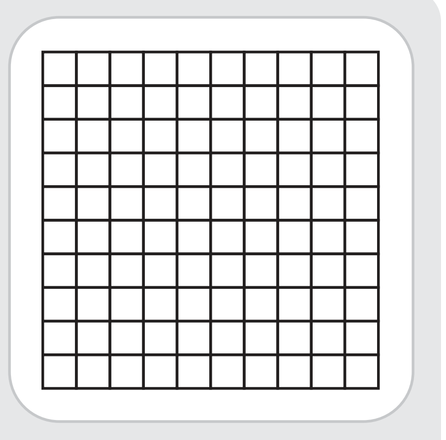
Model Subtraction Follow the directions to solve the problems.

1. The shaded minuend is a decimal number. The *x*'s represent the subtrahend, the number that is subtracted from the minuend. Use the model to solve the subtraction problem.

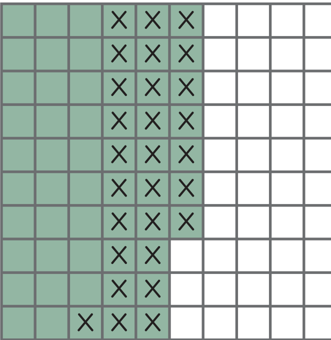
____________ – ____________ = ____________

Whiteboard: 2. Shade a model to represent the minuend and add *x*'s to represent the subtrahend.

0.1 – 0.09 = ____________



3. Write an expression to match the model. Then, use the model to evaluate the expression.



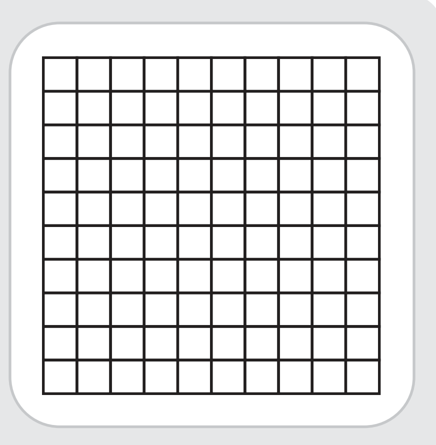
____________ – ____________ = ____________

4. Write an expression to match the model. Then, use the model to evaluate the expression.

_______________ – _______________ = _______________

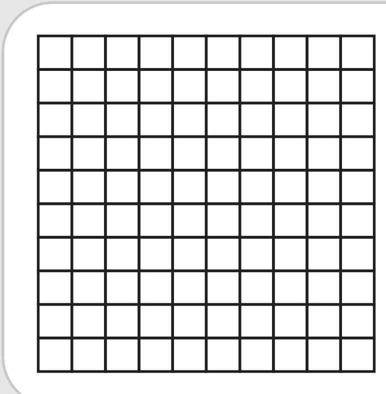
Whiteboard: 5. Create a model to match the expression, and then evaluate:

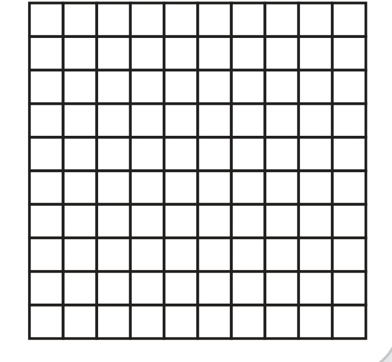
0.39 – 0.13 = _______________.



Whiteboard: 6. Create a model to match the expression, and then evaluate:

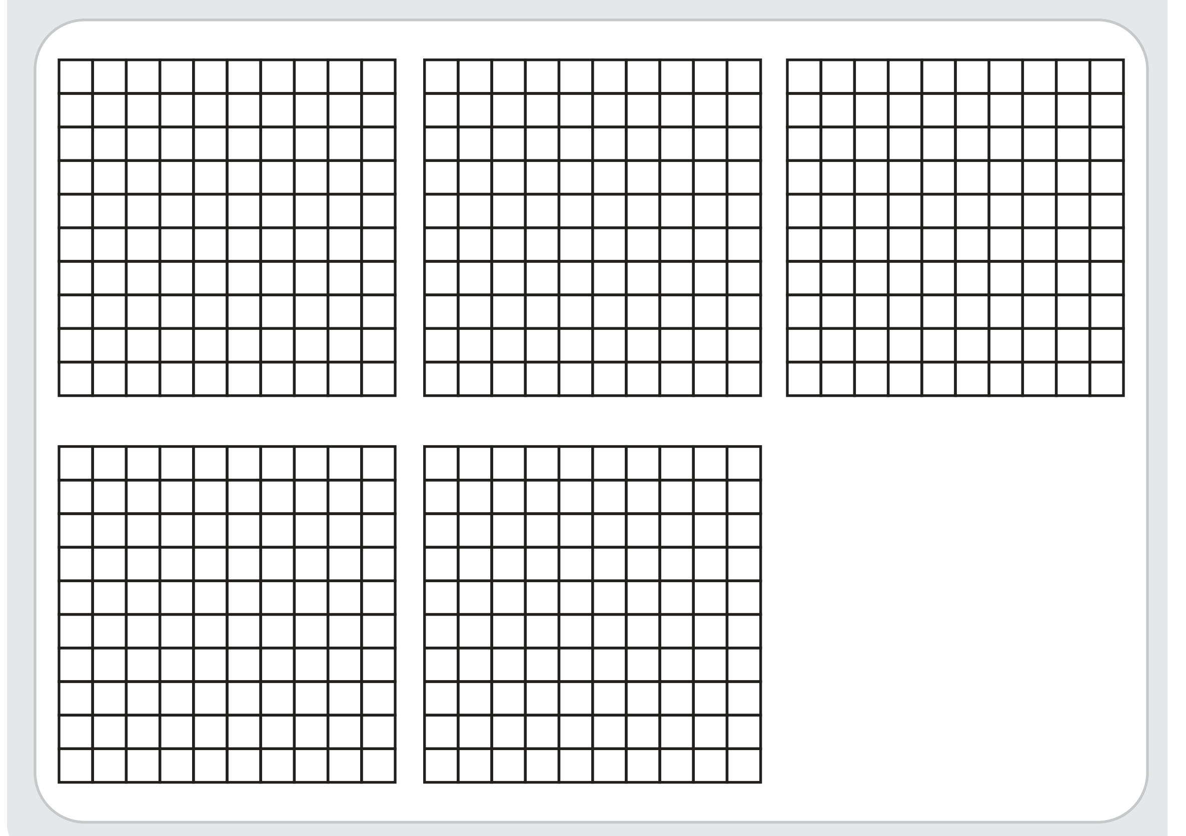
1.23 – 1.02 = _______________.





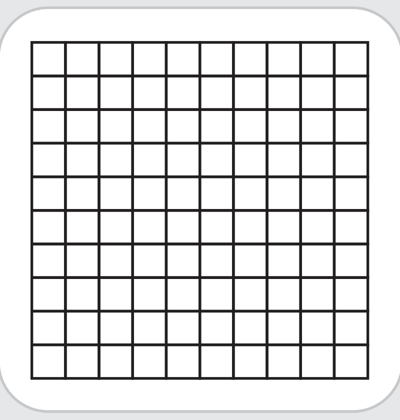
Whiteboard: 7. Create a model to match the expression, and then evaluate:

4.14 – 3.09 = ________.



Algorithm Connection Follow the directions to solve the problems.

Whiteboard: 1. Create a model for the expression: 0.2 – 0.05 = ________.



2. Record the problem in the place value chart: 0.2 – 0.05 = ________________.

Thousands	Ones			•	Decimals		
O	H	T	O	•	Tenths	Hundredths	Thousandths

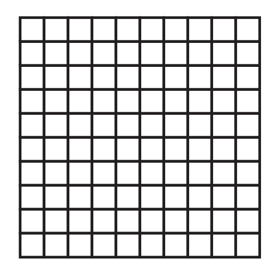
3. Use the model or place value chart to evaluate the expression:

0.2 – 0.05 = ________________.

CONNECT

Writing About Math

Explain why adding zeros to the right of the last non-zero digit in a decimal does not change its value. Use the models to help you write your explanation.



Check Your Understanding

Follow your teacher's instructions to complete this activity.

LESSON 9

Estimating Decimal Differences



Learning Target

- I can estimate **differences** of decimal numbers.

ACCESS

The Nile Delta Read the passage and respond to the question.



Photo Credit: Sergei25 / Shutterstock.com

The Nile Delta begins approximately 20 kilometers north of Cairo and continues 150 kilometers further north until it meets the Mediterranean Sea. About 45 million people live in the Nile Delta region. Al Sharqia is on the eastern edge of the delta. Approximately 7.78 million people live in Al Sharqia.



About how many people live in the Nile Delta, but do not live in Al Sharqia?

BUILD

A Closer Look at Close Numbers For Problems 1 and 2, use your assigned strategy to estimate the difference. For Problems 3 through 10, use the estimation strategy of your choice. Then, calculate the actual difference.

1. 2.419 – 1.240 Estimate: ______
2. 35.9 – 10.8 Estimate: ______
3. Estimate: 29.98 – 11.99 ______________
4. Evaluate: 29.98 – 11.99 = ______________
5. Estimate: 0.97 – 0.82 ______________
6. Evaluate: 0.97 – 0.82 = ______________

7. Maha and Ola are botanists studying the plants along the river Nile. They compare the height of papyrus in different study plots. Use their data table to answer the following questions.

Height of Papyrus in Different Plots				
	Study Plot A	**Study Plot B**	**Study Plot C**	**Study Plot D**
Height in Meters	4.45 meters	4.15 meters	4.32 meters	5.05 meters

Estimate the difference between the heights of papyrus in Study Plot D and Study Plot B. ______

8. Evaluate: 5.05 – 4.15 = ______.

9. Estimate the difference between the height of the papyrus in Study Plot A and Study Plot C. ______

10. Evaluate: 4.45 – 4.32 = ______.

A Reason to Subtract

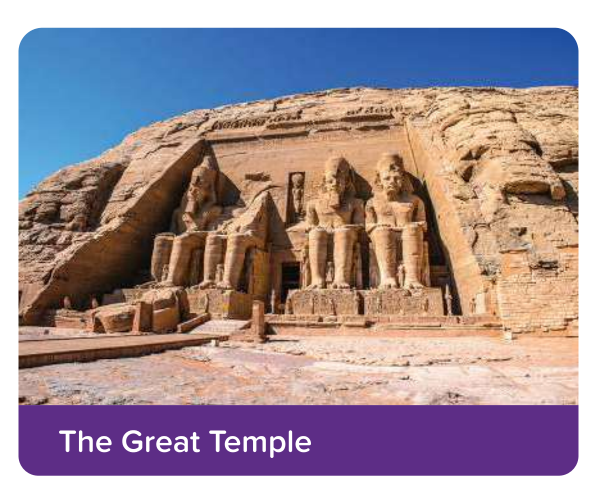
1. Think of an example from real life where you would need to estimate the difference between 45.30 and 30.20. Write a story problem using the numbers.

2. Estimate: 45.30 – 30.20 ______

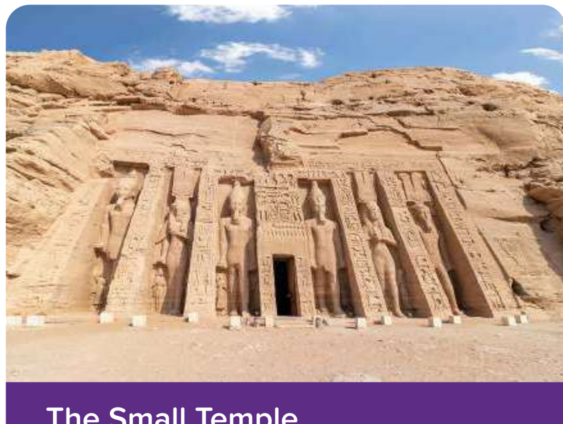
3. Evaluate: 45.30 – 30.20 = ______

CONNECT

Math around Egypt: Abu Simbel Read the passage and respond to the questions.



The Great Temple



The Small Temple

Abu Simbel is a world-renowned archaeological site that has two temples, The Great Temple and The Small Temple. The temples were carved into the side of a mountain. Each statue at the Great Temple is about 21 meters tall. The Small Temple houses many statues that are each about 12 meters high. To protect them from flooding, the temples were cut into pieces weighing between 2.72 to 18.14 metric tons and moved. After being moved, they were put back together exactly as they had been. The project took almost 5 years and involved about 3,000 workers. (1 kg = 1000 gm)

Photo Credit: Sergei25 / Shutterstock.com

1. How much taller are the Great Temple statues than the Small Temple statues?
2. Which word(s) indicate that an estimated number was used?



Check Your Understanding

Follow your teacher's instructions to complete this activity.

LESSON 10

Subtracting to the Thousandths Place



Learning Targets

- I can apply strategies to subtract decimals to the Thousandths place.
- I can check the reasonableness of my answers.

ACCESS

A Deeper Dive into Deltas Read to learn more about deltas and then answer the question.

The Nile Delta was created by deposits and clay brought from the Ethiopian Plateau. It varies in thickness from 15.24 meters to 22.9 meters. The delta plain extends 160.934 kilometers from north to south, and its widest east–west point is 249.448 kilometers between Damietta and Port Said.



River Nile and Delta at Night

Photo Credit: Sergei25 / Shutterstock.com

Diaa and Ezz wanted to find the difference between the thickest part and the thinnest part. Ezz rounded and gave an estimate of 8 meters. Diaa solved the problem using the algorithm and found the actual answer to be 7.66 meters. do you think Ezz's answer is reasonable? Why or why not?

BUILD

Taking Away Parts Evaluate each difference. Then identify each digit's place value when instructed. Finally, compare answers with a partner.

1. 8 Thousandths – 5 Thousandths = ______ Thousandths
2. 57 Thousandths – 12 Thousandths = ______ Thousandths

   Place value: ______ Hundredths and ______ Thousandths
3. 32 Thousandths – 15 Thousandths = ______ Thousandths

   Place value: ______ Hundredths and ______ Thousandths
4. 5 Hundredths – 24 Thousandths = ______ Thousandths

   Place value: ______ Hundredths and ______ Thousandths

Is It Reasonable? Work with your teacher to estimate differences and check the reasonableness of answers.

Spin a Difference Play with a partner to practice estimating and subtracting decimals to the Thousandths. For each round, copy the place value table and recording sheet into your Math Notebook and record your results.

Directions:

1. Each player spins all three spinners to create two decimal numbers and records their numbers in the place value chart. (The larger number must go on top.)
2. Players use any strategy to estimate their differences and record their estimates.
3. Players find the actual differences.
4. Players record all of the differences and compare them using >, <, or =.
5. The player with the lowest difference wins.
6. Players discuss how estimation helped them check the reasonableness of their answers.

Photo Credit: Sergei25 / Shutterstock.com

Recording Sheet

Round: ____________

Thousands	Ones			•	Decimals		
O	H	T	O	•	Tenths	Hundredths	Thousandths

My Estimated Difference: ____________

My Actual Difference: ____________

My Partner's Difference: ____________

Compare the Difference: ____________

CONNECT

Math around the World: River Deltas Read about two other famous deltas in the world and then answer the questions.


The Ganges Delta

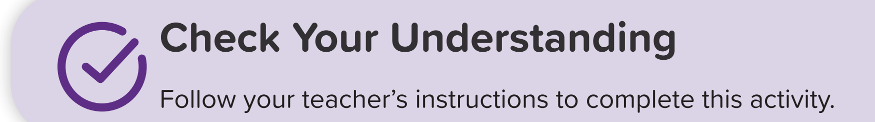

The Mississippi Delta

Photo Credit: Sergei25 / Shutterstock.com

The Ganges Delta is another famous river delta. It is in the South Asia area of Bangladesh and India. The delta plain is about 350 kilometers wide along the Bay of Bengal. This delta is formed by sediment that washes down from the Himalayan mountains.

In North America, the Mississippi River flows south 3,778.74 kilometers from the state of Minnesota to the Gulf of Mexico. At its widest, the Mississippi Delta is 140.01 kilometers.

1. Order the widths of the three deltas from narrowest to widest. (Nile = 249.448 kilometers wide)
2. Find the difference between the width of the Ganges Delta and the width of the Nile Delta.


Check Your Understanding

Follow your teacher's instructions to complete this activity.

LESSON 11
Decimal Story Problems

Learning Target

- I can add and subtract decimal numbers to the Thousandths place to solve story problems.

ACCESS

Tahya Misr Bridge Read the passage and answer the questions.

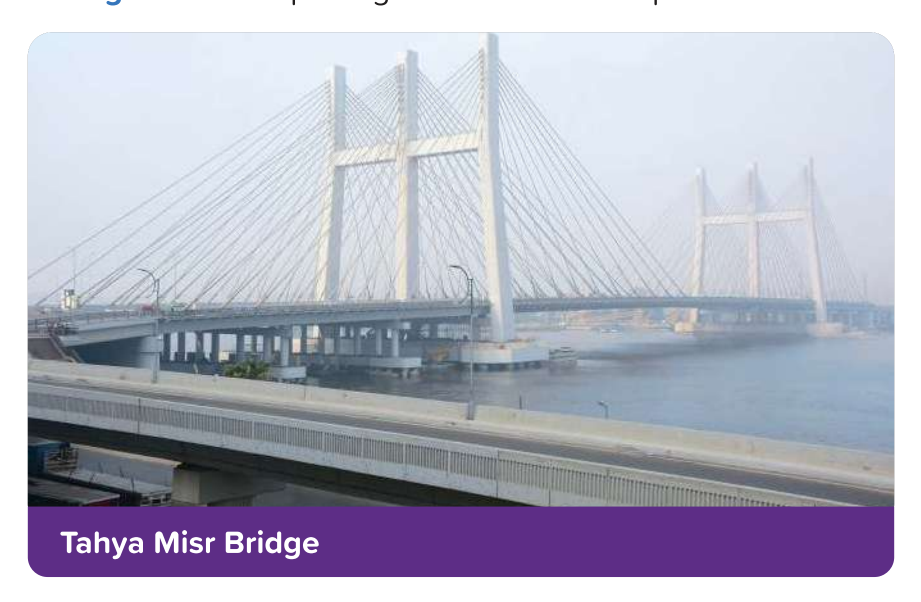

Tahya Misr Bridge

Photo Credit: Sergei25 / Shutterstock.com

The Tahya Misr Bridge was built in 2016 in Cairo. It serves as a connector across the Nile from northern and eastern Cairo to western Cairo. The bridge is 540 meters long and 67.3 meters wide. It holds the world record for the widest cable-stayed bridge in the world.

The longest cable-stayed bridge is the Jiaxing-Shaoxing Sea Bridge in Japan. it is 11.7 meters thinner than the Tahya Misr Bridge. How wide is the Jiaxing-Shaoxing Sea Bridge?

BUILD

Bridges and Fish Read and think about what the question is asking you to do. Do not solve yet.

1. The Tahya Misr Bridge was built using 200 cranes. The cranes varied in size and weighed between 6.44 and 544.3 tons (1 ton = 1,000 kilograms). What is the difference between the lightest crane and the heaviest crane?
2. Rashad and his father went on a fishing trip to Lake Nassar. They each caught a huge vundu catfish. The first one weighed 53.25 kilograms and the smaller one weighed 46.8 kilograms. How much did the fish weigh in all?

Decimal Story Problems For each problem,

1. The total length of the Tahya Misr Bridge is 16.7 kilometers.

   If Rami travels the length of the Tahya Misr Bridge and then returns, how many kilometers in total did he travel? Write an equation and your answer.
2. The total length of the Tahya Misr Bridge is 16.7 kilometers. Salem rode his bike along the pedestrian section of the bridge. He rode 3.25 kilometers before he had a flat tire. How many more kilometers does he need to travel?

More Decimal Story Problems For each problem, use the chart to help you

Nile River Fish	
Name	**Length**
African Tigerfish	104.902 cm
Eel Catfish (Mudfish)	32.7 cm
Marbled Lungfish	201.168 cm
African Knifefish	30.2 cm

1. Ehab and his brother went fishing for 2 days. On the first day, they each caught an African tigerfish. On the second day, Ehab managed to catch a marbled lungfish. What is the total length of 2 tigerfishes and 1 marbled lungfish?
2. Basem is an ichthyologist. He was comparing the longest length of fish in the table to the shortest length of fish. What is the difference in length?
3. Basem collected a sample of three African knifefish. The first one was 29.28 centimeters, the second was 29.255 centimeters, and the third was 35.17 centimeters. What is the difference between the longest and the shortest fish in the sample?



CONNECT

Math around the World: Famous Bridges Look at the data. Use the numbers from the chart to write a story problem. Swap problems with a partner and solve each other's story problems.

Bridge Name	Location	Width (in meters)
Tahya Misr	Egypt	67.3
Pont de Normandie	France	23.6
Tatara Bridge	Japan	30.6
Queensferry Crossing	United Kingdom	32.918



Check Your Understanding

Follow your teacher's instructions to complete this activity.

UNIT

2

Theme 1 | Number Sense and Operations

Unit 2
Number Relationships



Grand Egyptian Multiples

Unit Video Questions



Quick Code
egm5031

The Unit 2 Opener Video, Grand Egyptian Multiples, explores math around Egypt through number relationships. In this unit, you will learn how numbers tell stories about the world around you through expressions and equations. You will also explore relationships between factors and multiples.

- ☐ How did the students use number relationships to make sense of the world around them?
- ☐ What did the students find out about factors and multiples?

Photo Credit: Mountains Hunter / Shutterstock.com



LESSON 1
Expressions, Equations, and Variables



Learning Targets

- I can explain the **difference** between expressions and equations.
- I can explain why there might be an **unknown** in an **expression** or **equation**.
- I can use letters or symbols to represent unknowns in expressions and equations.



ACCESS

East of Cairo Work with your teacher to read the passage. Then, respond to the questions.



Sinai Peninsula

Photo Credit: Hazem omar / Shutterstock.com

Sinai Peninsula is triangular and has an area of about 60,000 square kilometers. It is connected to Africa on the west by the Gulf of Suez, which is approximately 275 kilometers long. On the east it is connected to Asia by Aqaba Gulf that is approximately 180 km long. There are approximately 600,000 people living on Sinai Peninsula.

Mariam wrote two equations to compare the lengths of the two gulfs. Here are her equations.

- $180 + x = 275$
- $275 - 180 = x$

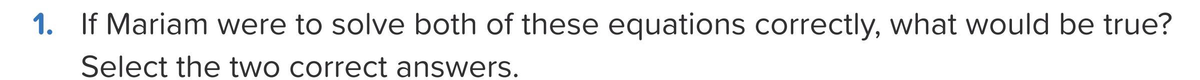
What does the letter x represent in these equations?

A. the length in kilometers of one gulf

B. the difference in kilometers between the two lengths

C. the width of Sinai Peninsula

D. the distance in kilometers between the gulfs



1. If Mariam were to solve both of these equations correctly, what would be true? Select the two correct answers.

   A. The value of x would be the same.

   B. The answer to $275 - 180$ would be 85 km.

   C. The difference between the two lengths would be 95 km.

   D. The distance in kilometers between the gulfs would be 95 km.

BUILD

What Does the Variable Mean? Read each problem and determine what the variable represents.

1. Basma wanted to write an equation with a variable to represent "12.5 plus a number equals 15." Which of the following would be correct?

   A. $12.5 + 15 = x$ B. $12.5 + x = 15$

   C. $15 + x = 12.5$ D. $x - 15 = 12.5$

2. Adham was comparing the heights of sand dunes in the northern part of Sinai Peninsula in meters. He wrote the equation $27 \text{ m} - 18 \text{ m} = x$. What does the x represent?

   A. the height of one of the dunes in Sinai

   B. the sum of the heights of two dunes in Sinai

   C. the difference between the tallest and shortest sand dunes

   D. the distance between the tallest and shortest sand dunes

3. If Farha knew that the sum of the heights of two sand dunes is 46 meters and one of the dunes is 18.25 m high, which equation could she write to find the unknown height? Select the two correct answers.

   A. $18.25 + x = 46$ C. $46 - 18.25 = x$

   B. $18.25 + 46 = x$ D. $x - 18.25 = 46$

4. Ehab wrote the equation $42.7 + 38.3 = x$. If each of the numbers represents the height of one of the dunes, what does x represent?

   A. the height difference between the dunes

   B. the sum of the heights of both dunes

   C. the height of the taller dune

   D. the distance between the dunes



Sand Dunes

Equations and Expressions Work with your teacher and classmates to compare the problems. Look at the problems. How are they similar? How are they different?

$3.6 + 1.6 = x$	$14.78 - 3.4$	$7.5 + 3.65$
$25.6 - 9$	$14 \times 7 = x$	$9 - x = 3.5$

Equation or Expression? Check your understanding of equations and expressions.

1. Read the mathematical phrases. Sort them into Equations, Expressions, or Neither.

- $4.7 + 3.6 = M$
- $6.4 + 3.2 + 8$
- $125 - 27.3$
- $56 - x = 47.5$
- $3.4 + L$
- Aya ran a total of 8 km last week. She ran 3.75 km on Monday. How much did she run the rest of the week?
- $345.45 - 123.8 = x$
- $3.5 + 2.456 = 2.5 + 3.456$
- $14.2 - 3.575$
- $37.125 - 13.7$
- $7.3 + 4.5 + 2.3 = A$
- Amir had 3.5 kg of apples and 2.7 kg of figs.

Equations	Expressions	Neither



CONNECT

Writing About Math Read and respond to the questions. Be prepared to share your thinking.

1. Is $4.5 + 6.25 = x$ the same as $4.5 + 6.25 = M$? Why or why not?
2. Is $2.34 + 6 = 1.34 + 7$? Why or why not?



Check Your Understanding

Follow your teacher's instructions to complete this activity.

LESSON 2

Variables in Equations

Learning Target

- I can apply the relationship between addition and subtraction to find the value of the unknown in an equation.

ACCESS

Number Talk Use mental math to solve the problems provided by your teacher. Be prepared to share how you solved them.

BUILD

Photo Credit: Hazem omar / Shutterstock.com

Into the Unknown First, use mental math to estimate and then solve the equations. Use a place value chart, if needed.

1. $8.23 + p = 10.24$

$p =$ __________

2. $T - 2.45 = 0.26$

$T =$ __________

3. $2.45 + n = 5.24$

$n =$ __________

4. $V + 42.89 = 100.01$

$V =$ __________

5. $h - 6.82 = 1.23$

$h =$ __________

6. $j - 12.40 = 3.01$

$j =$ __________

7. $5.52 + 2.01 + m = 9.21$

$m =$ __________

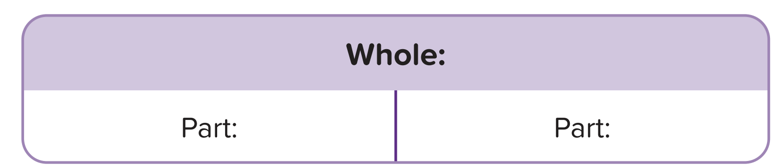
8. $2.30 + 3.10 = 1.50 + v$

$v =$ __________

9. Ezz ran three days last week. He ran 5.24 kilometers on Monday and 6.50 km on Wednesday. If he ran a total of 15 km for the week, how much did he run in the third day?

What would the variable in the problem represent? Solve the problem.

Writing Equations to Match Write an equation to represent the story problems using x as the variable. Use a part-to-whole bar model (as shown) to help you. (You are not solving the equations at this time.)



1. Basem is taking a bus from Cairo to Ras Muhammad National Park to visit the coral reefs. The total journey is 492.64 kilometers. After 396.48 km, the bus stops in El Tor to pick up more passengers. How far is El Tor from Ras Muhammad National Park?
2. Basem and his friend Jana were snorkeling in Ras Muhammad National Park on the coral reef. Basem saw a hawksbill sea turtle that was 0.78 meter long. Jana saw a green turtle that was 0.58 m longer. How long was the green turtle?
3. In Jana's backpack she has a water bottle that weighs 1.5 kilograms, books that weigh 2.451 kg, and a snack. Her filled backpack weighs 4.535 kg. How much does her snack weigh?
4. At the market, Basem bought two melons for a total weight of 2.64 kilogram. If one melon weighed 1.36 kg, what was the weight of the other melon?

CONNECT

Math around Egypt: Ras Muhammad National Park Work with your teacher to read the passage. Then, respond to the question.

The Ras Muhammad National Park is located in the south of Sinai Peninsula. The total area of the park, including its marine and land surface area is 480 square kilometers. If the marine area is 345 km^2, how large is the surface area of the land in the park?


Ras Muhammed National Park

1. What would the variable represent in this equation?
2. Estimate the answer.
3. Solve the problem.



Check Your Understanding

Follow your teacher's instructions to complete this activity.

LESSON 3

Telling Stories with Numbers



Learning Targets

- I can write story problems involving addition and subtraction of decimal numbers.
- I can solve equations involving decimal numbers to the Thousandths place.



ACCESS

Error Analysis Read the problem and complete the error analysis.

Most years, the northern region of Sinai Peninsula gets 12.5 centimeters of precipitation in the winter. Last year it received only 9.17 cm. What is the difference between the two amounts?

Taha read this problem, wrote the following equation, and solved it. Analyze Taha's work. Identify what he did correctly and incorrectly, then try to solve the problem.

$12.5 + 9.17 = x$ $\qquad$ $x = 21.67$ cm

1. What did the student do correctly?
2. What did the student do incorrectly? Why do you think he made this error?
3. Try to solve the equation $12.5 + 9.17 = x$. Is this the correct equation to solve the problem? Explain your thinking.

BUILD

What Is the Equation? Read the story problems and follow the directions given by your teacher.

A. Ola needed 10 meters of wood to build a garden bed. She found 3.5 m in her garage. How many more meters of wood does she need for the bed?

B. Nagi is training for a race. Each day of the week he runs 3.5 kilometers. If he runs for 10 days, how far will he have run?

Work with a partner to write a story problem that is modeled by this equation: $2.8 + 1.5 = C$.

What Is the Story?

1. Write a story problem for the equation and then solve: $x + 2.75 = 12.5$.

2. Write a story problem for the equation and then solve: $124.6 - 72.25 = m$.

3. Write a story problem for the equation and then solve: $34.750 - s = 15.25$.

CONNECT

Math around Egypt: Mount Sinai

Work with your teacher to read the passage. Then, answer the questions.

Tens of thousands of visitors travel each year to climb Jebel Mūsā, or Mount Sinai. There are two paths to reach the summit. The first path can take anywhere from $\frac{3}{4}$ of an hour to 3 hours to climb. The second path usually takes about 2.5 hr to walk.


Climbing Mount Sinai

Use the information in the passage to write a story problem to match the equation, and then solve: $1.25 + x = 2.5$.



Check Your Understanding

Follow your teacher's instructions to complete this activity.



LESSON 4
Prime Factorization



Learning Target

- I can use a **factor tree** to identify the **prime** factors of a given number.



ACCESS

Prime versus Composite Read the question and choose the answer from the options given.

What is the best explanation for the difference between prime and composite numbers?

A. A prime number has only 2 factors: 1 and itself. A composite number has more than two factors.

B. A prime number has only 1 as a factor and a composite number has two factors.

C. A prime number has only 2 factors. A composite number has 4 or more factors.

D. A prime number can be factored in more than one way. A composite number can be factored in only one way.

Photo Credit: OlegD / Shutterstock.com

Prime or Composite Pop Up Play the game as directed.

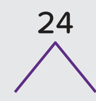
Directions:
- Your teacher will say a number.
- If it is a **prime number**, pop up (stand).
- If the number is **composite**, stay seated and then share a **factor pair** other than 1 and the number with a partner.



BUILD

Whiteboard: Exploring Factor Trees Work with your teacher to complete the factor trees.

Complete the factor trees by filling in the missing factors in your journal or using the digital tool.





Whiteboard: Prime Factorization

- Complete each of the factor trees (one of the factors is already listed).
- Decompose the composite factors until only prime numbers remain.
- Circle the prime factors. Draw a square around the composite factors.
- Record the prime factorization for each factor tree.
  (Example: $24 = 2 \times 2 \times 2 \times 3$)

1. 18 → 3

2. 20 → 2

3. 75 → 5

Photo Credit: OlegD / Shutterstock.com

Products of Prime Factors Find the product of the prime factorization listed. Then, list all other factors of the product.

1. $2 \times 2 \times 5 =$ ____________

Other factors:

2. $2 \times 3 \times 7 =$ ____________

Other factors:

3. $2 \times 2 \times 2 \times 7 =$ ____________

Other factors:



CONNECT

Math around Egypt: The Suez Canal Work with your teacher to read the passage. Then, answer the questions.

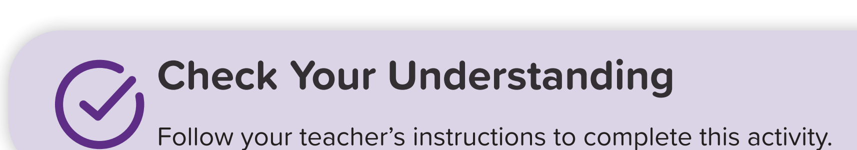


Suez Canal

Photo Credit: OlegD / Shutterstock.com

At the northern edge of the Gulf of Suez lies the Suez Canal. The Suez Canal extends 193 kilometers and cuts thousands of miles from the shipping routes between Europe and Asia. Before the canal was built, ships had to sail all the way around the southern tip of Africa. Now, they can pass directly from the Red Sea to the Mediterranean Sea.

1. It takes 12 to 16 hours for a ship to go through the canal. Akram was curious. If a ship takes 12 hr and travels 193 kilometers, can it go an equal distance each hour? To solve the problem, he needs to know if 12 is a factor of 193. He makes a factor tree starting with 1 and 193. Basem told him the factor tree would not help him answer his question. Is Basem correct or incorrect? Why?
2. Is 193 prime or composite?
3. Is 12 a factor of 193? How do you know?
4. Is 1 prime or composite or neither? Why?



Check Your Understanding

Follow your teacher's instructions to complete this activity.



LESSON 5
Greatest Common Factors (G.C.F)



Learning Targets

- I can use factor trees to identify **common factors** of two whole numbers.
- I can use factor trees to identify the **greatest common factor** of two whole numbers.



ACCESS


Free Divers

Diving in the Red Sea Work with your teacher to read the passage and respond to the questions.

Scuba diving is a popular tourist attraction in the Red Sea. One of the more popular dives is to an 80-meter-long steamship that sank in 1876. The crew worked for 14 hours to dislodge the boat, but it capsized and sank to the seabed 30 meters below.

1. Shadi and Taha went diving to the steamship. They each stopped at intervals of equal depths to check their gear. Shadi dove to the stern at 30 meters below the surface. What are all the options of intervals he could take? (Stopping every 1 m is not practical, nor is going the entire distance.)

   A. 2 m, 3 m, 5 m
   B. 2 m, 3 m, 5 m, 6 m
   C. 2 m, 3 m, 5 m, 6 m, 10 m, 15 m
   D. 2 m, 3 m, 5 m, 6 m, 10 m, 12 m

2. Taha dove to the hull at a depth of 15 meters. What are the options of intervals he could take? (Stopping every 1 m is not practical, nor is going the entire distance.)

   A. 3 m, 5 m
   B. 2 m, 3 m, 5 m
   C. 2 m, 3 m, 5 m, 6 m
   D. 2 m, 3 m, 5 m, 6 m, 10 m

Challenge If both divers stop at equivalent equal intervals, what is the greatest distance they can both dive before stopping?

A. 2 m
B. 3 m
C. 5 m
D. 10 m



BUILD

What Do They Have in Common? Read and complete each problem.

1. List the factors of 20.
2. List the factors of 28.
3. What is the product of the following prime numbers? $2 \times 3 \times 3 =$ ________
4. What is the product of the following prime numbers? $3 \times 3 \times 5 =$ ________

Greatest Common Factors (G.C.F) Work independently to complete the problems.

1. List the factors of 42.
2. Complete the factor tree for 42 and write out the prime factorization.
3. Find the value of n : $n = 2 \times 2 \times 7$
4. What are common factors of 42 and n?
5. What is the greatest common factor of 42 and n?

42
2



6. Two groups took public transportation in Sharm El Sheik. Each ticket costs the same amount of money. One group spends 16 LE and the other group spends 12 LE. At most, how much does each ticket cost? (Hint: Use the GCF.)

   A. 2 LE
   B. 4 LE
   C. 6 LE
   D. 8 LE

CONNECT

Writing About Math Explain in your own words what you know about prime factorization and how it helps you find the greatest common factor of two numbers. What relationships are revealed by breaking numbers into factors?

Check Your Understanding

Follow your teacher's instructions to complete this activity.



LESSON 6
Identifying Multiples



Learning Targets

- I can explain the meaning of **multiples**.
- I can identify common multiples of two whole numbers up to 12.



ACCESS

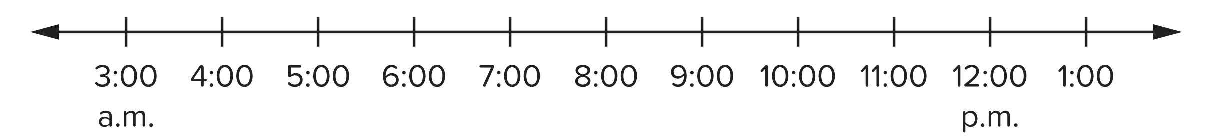

Ras Abu Galum

Ras Abu Galum Work with your teacher to read the passage. Then, answer the questions.

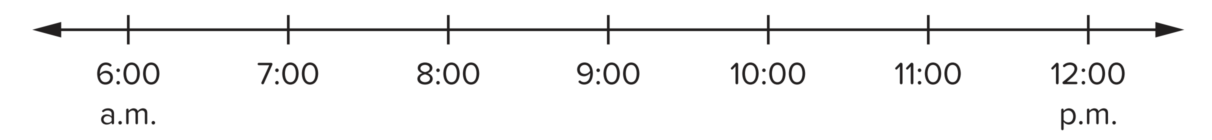
In the northeast corner of Sinai, along the Gulf of Aqaba, is the Ras Abu Galum Protectorate.

Photo Credit: OlegD / Shutterstock.com

1. Omar wants to take the bus to visit this region. During the week, a bus leaves for Ras Abu Galum at 3 a.m. Additional buses leave every 3 hours. The last bus leaves at 12 p.m. What times can Omar catch the bus?



2. On the weekend, the first bus leaves for Ras Abu Galum at 6 a.m. Additional buses leave every 2 hours until 12 p.m. What times can Omar catch the weekend bus?



3. What times can Omar always catch a bus, whether it is a weekday or the weekend?



BUILD

Skipping Along Complete the following.

1. List the first five multiples of 6.
2. List the first six multiples of 7.
3. List eight multiples of 10.
4. Adel is buying cartons of eggs and bottles of juice at the supermarket to make breakfast for friends. Each carton contains 12 eggs. Complete the chart for Adel.

Cartons	1	2	3	4	5	6
Eggs	12					

5. The juice comes in packs of 9. Complete the chart for Adel.

Packs	1	2	3	4	5	6
Juice	9					

6. If Adel is buying enough eggs and juice for 36 people, how many cartons of eggs and packs of juice will he need to buy for each guest to have 1 egg and 1 juice?

Common Multiples Complete the following.

1. List the first five multiples of 5.
2. List the first ten multiples of 2.
3. What common multiples of 2 and 5 did you list?
4. List the first five multiples of 8.
5. List the first six multiples of 4.
6. List the first five multiples of 6.
7. What common multiples of 8, 4, and 6 did you list?
8. List the first twelve multiples of 3.
9. List the first twelve multiples of 4.
10. What common multiples of 3 and 4 did you list?



11. Use this information to fill in the Venn Diagram for the first 12 multiples of 3 and 4, placing the common multiples in the shared center.

Multiples of 3 **Multiples of 4**

12. Select the three numbers that are NOT common multiples of 5 and 7.

A. 14 C. 35 E. 70

B. 21 D. 55 F. 105

13. Select the three numbers for which 24 and 32 are common multiples.

A. 2 C. 4 E. 7

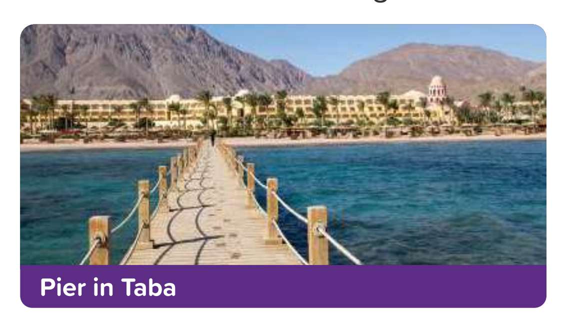
B. 3 D. 6 F. 8

14. Doha and her little brother are laying out train tracks. Each train track is 12 centimeters long. How long are the first 5 pieces of track laid end to end?

15. How many pieces of track would Doha and her brother need to make the same distance from Problem 14 if the track pieces were 4 centimeters long?

CONNECT

Writing About Math Read the question and respond in your math notebook. Be prepared to share your thinking with the class.


Pier in Taba

Aya thinks a number can have unlimited multiples but a limited number of factors. Do you agree or disagree? Explain your thinking.



Check Your Understanding

Follow your teacher's instructions to complete this activity.



LESSON 7

Least Common Multiple (L.C.M)



Learning Targets

- I can explain the meaning of **least common multiple**.
- I can identify the least common multiple of two whole numbers up to 12.

ACCESS

Vocabulary Check-In Fill in the blanks with the vocabulary terms from the word bank. You may use a term more than once.

prime	factor	one
composite number	product	multiples

1. A ________ is a number with more than one set of factor pairs.
2. A ________ is a number multiplied by another number to find a product.
3. Skip counting is a way to find ________ of a number.
4. ________ is a factor of all numbers.
5. A ________ number's only factor pair is one and itself.
6. A ________ is the answer to a multiplication problem.

Using Vocabulary Complete the following.

1. Give an example of a prime number.
2. Write a multiplication equation. Label the factors and the product.
3. Give an example of a composite number with at least two factor pairs. Write the factor pairs for the number.

BUILD

Least Common Multiple List at least three multiples of each number, then find the least common multiple (LCM) for each pair of numbers. If you do not find the LCM in the first three multiples, continue to list multiples until you find one.



1. 6 and 9
   Multiples of 6: ______________
   Multiples of 9: ______________
   LCM: ______________

2. 2 and 3
   Multiples of 2: ______________
   Multiples of 3: ______________
   LCM: ______________

3. 10 and 5
   Multiples of 10: ______________
   Multiples of 5: ______________
   LCM: ______________

5. 5 and 11
   Multiples of 5: ______________
   Multiples of 11: ______________
   LCM: ______________

4. 3 and 8
   Multiples of 3: ______________
   Multiples of 8: ______________
   LCM: ______________

6. 5 and 6
   Multiples of 5: ______________
   Multiples of 6: ______________
   LCM: ______________

Challenge Find the LCM of 7, 6, and 12. ______________________________

LCMs in the Real World List multiples to solve the problems. Fill in the charts and use the information to help you solve the problems.

1. Badr is buying kofta and aish baladi for his birthday party. The kofta is sold in packages of 3. The bakery sells the aish baladi in packages of 12. Badr wants to have exactly the same number of each. What is the minimum number of kofta and aish baladi he should buy?

Package	1					
Kofta	3					

Package	1					
Aish Baldi	12					

2. Hend and Jana are biking around a small lake. Hend makes a complete lap around the lake in 6 minutes. It takes her younger sister, Jana, 8 minutes to finish one lap. If Hend and Jana continue to bike around the lake at the same rate, how many minutes will it take for them to come together at the starting point again?

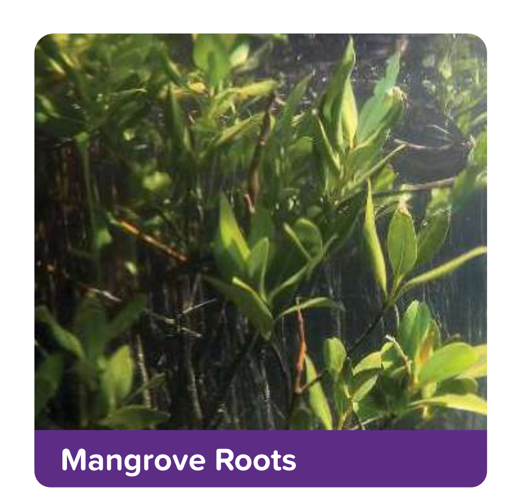


Lap	1					
Hend	6					

Lap	1					
Jana	8					

CONNECT

Math around Egypt: Mangroves Work with your teacher to read the passage. Then, answer the question.


Mangrove Roots

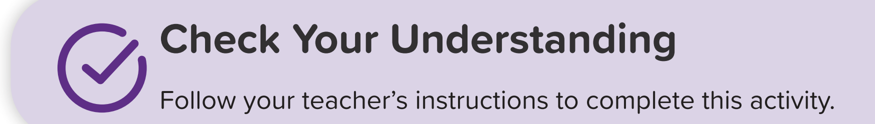
Mangrove trees grow in the Ras Abu Galum Protectorate and other areas of Egypt.

In one garden, Nada digs a hole to plant a mangrove seedling every 4 days. In a second garden, she plants a seedling every 6 days. If she plants seedlings in both gardens today, in how many days will she plant seeds again in both gardens on the same day?

Use the tables as needed.

Garden 1						
Day						

Garden 2						
Day						



Check Your Understanding

Follow your teacher's instructions to complete this activity.



LESSON 8
Factors or Multiples?



Learning Targets

- I can explain the difference between factors and multiples.
- I can identify the greatest common factor and least common multiple of two given numbers.

ACCESS


Route to Sinai

Sinai Trail Work with your teacher to read the passage. Then, answer the questions.

The trail winds from the Gulf of Aqaba to the top of Mount Saint Catherine. Many Egyptians and visitors from around the world have hiked the trail.

Mohamed is training to hike Sinai Trail. For part of his training, he goes hiking every 7 days and lifts weights every 4 days. He did both types of exercise today. How many days from now will he both go hiking and lift weights?

BUILD

Factors and Multiples Discuss the questions with your Shoulder Partner and then solve.

What are two factors that 12 and 8 share? What are two multiples that they share? What do you notice? Find their LCM and GCF.

Greatest and Least Find the GCF and LCM for each number pair.

1. 12 and 10 GCF: ________ LCM: ________
2. 9 and 5 GCF: ________ LCM: ________
3. 11 and 2 GCF: ________ LCM: ________
4. 8 and 4 GCF: ________ LCM: ________
5. 9 and 12 GCF: ________ LCM: ________

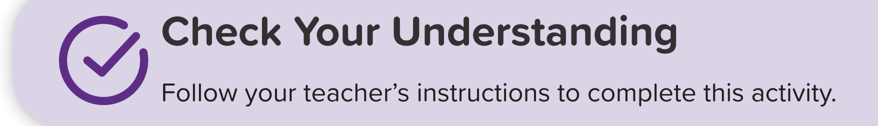


GCF or LCM? Follow your teacher's directions to discuss and solve each problem.

1. Omnia has two strips of cloth. One is 35 centimeters wide, and the other is 75 cm wide. She wants to cut both pieces into strips of equal width that are as wide as possible. How wide should she cut the strips? Do you have to find the GCF or the LCM? What is the answer?
2. Omar exercises every 12 days. Rana exercises every 8 days. Both friends exercised together today. How many days will it be until they exercise together again? Do you have to find the GCF or the LCM? What is the answer?
3. Menna is giving her friends pencils and special erasers. The store sells pencils in boxes of 8 and erasers in boxes of 10. If Menna wants the same number of each, what is the minimum number of pencils that she will have to buy? Do you have to find the GCF or the LCM? What is the answer?
4. Nour is making snack bags for an upcoming trip. He has 6 oranges and 12 pieces of dried fruit. He wants the snack bags to be identical without any food left over. What is the greatest number of snack bags Nour can make? Do you have to find the GCF or the LCM? What is the answer?
5. Malak baked 30 servings of cakes and 48 servings of baklava for her family. She wants to divide the desserts into containers so that each person receives the same number of servings. How many containers will she need? Do you have to find the GCF or the LCM? What is the answer?
6. Ola sells baskets of figs that each hold 9. She also sells bags of pomegranates that each hold 7. If she sells the same number of each, what is the smallest quantity of each type of fruit that she sold? Do you have to find the GCF or the LCM? What is the answer?

CONNECT

Writing About Math Read and respond to the Essential Question: *How are all numbers related through factors and multiples?*



Check Your Understanding

Follow your teacher's instructions to complete this activity.



UNIT 3

Theme 1 | Number Sense and Operations

Unit 3
Multiplication with Whole Numbers

Video

Multiplying Books

Photo Credit: MidoSemsem / Shutterstock.com

Unit Video Questions

The Unit 3 Opener Video, Multiplying Books, explores math around Egypt through multiplication. In this unit, you will use models to help build your understanding of multiplication. You will learn how to use place value to solve multiplication problems.

Quick Code
egm5055

- ☐ How did multiplication help the students make sense of the world around them?
- ☐ What did the students find out about multiplication and place value?

LESSON 1

Using the Area Model to Multiply



Learning Target

- I can multiply using the **area model**.

ACCESS

Fast Fact Check-In Complete as many equations as possible in the time provided.

1. $5 \times 1{,}000 =$
2. $4 \times 10 =$
3. $1{,}000 \times 7 =$
4. $10{,}000 \times$ ________ $= 80{,}000$
5. $2 \times$ ________ $= 2{,}000$

Photo Credit: ImAAm / Shutterstock.com

Writing Expressions Write an expression to complete each equation using powers of ten for each given number.

1. 3,000 = ________ × ________
2. 800 = ________ × ________
3. 400,000 = ________ × ________
4. 70,000 = ________ × ________
5. 50 = ________ × ________

Multiplying Tens How many times will 10 need to be multiplied by itself to equal each given number?

1. 100
2. 1,000
3. 10,000
4. 100,000

BUILD

Expanding an Equation Look at the area model example.

Area Model Example: $234 \times 27 =$ ________

	200	30	4
20	4,000	600	80
7	1,400	210	28

```
  1 1
 4,000
 1,400
   600
   210
    80
+   28
 6,318
```

Whiteboard: Expanding Equations Work with your teacher and classmates to create area models and find each product.

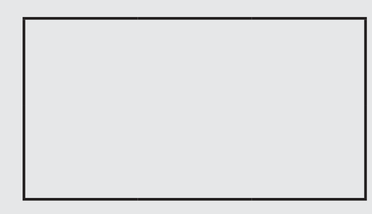
1. $374 \times 62 =$ ________

374×62

		70	
2		140	8

2. $506 \times 42 =$ ________

506×42



3. Create your own area model for $732 \times 16 =$ ________.

Photo Credit: ImAAm / Shutterstock.com

Using an Area Model Solve the problems using an area model.

1. $572 \times 98 =$ ________

2. $201 \times 32 =$ ________

3. $659 \times 42 =$ ________

4. $3{,}352 \times 17 =$ ________

5. Ali walks 6 kilometers each day. If he walked 187 days a year, how many kilometers would he walk?

6. What if Ali were to drive 60 kilometers each day? How many kilometers would he drive in 187 days?

Decompose with Area Model Eman is planting a garden. She wants to find the area of the garden to know how much topsoil she will need. The garden is 46 meters long and 24 m wide. How many different ways can you decompose the numbers to help her find the area?

$46 \times 24 =$ ____________

Example:

	20	20	6
20			
4			



CONNECT

Math around Egypt:

Omar owns a travel company that takes visitors throughout the mountains of the Eastern Desert which is a mountain range that runs parallel to the Red Sea coast. He has 12 buses. Each bus can hold 25 passengers. How many passengers can Omar take each day if every bus is full?

Check Your Understanding

Follow your teacher's instructions to complete this activity.

LESSON 2

The Distributive Property of Multiplication



Learning Target

- I can explain the relationship between the area model of multiplication and the **Distributive Property of Multiplication**.

ACCESS

Error Analysis Read the problem and complete the error analysis.

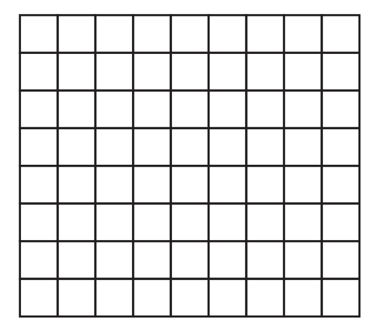
Badir thinks $206 \times 45 = 11,700$. Identify what Badir did correctly and incorrectly and then solve the problem.

	200	60	0
40	8,000	2,400	0
5	1,000	300	0

$$\begin{array}{r} 8,000 \\ 1,000 \\ 2,400 \\ +\ \ 300 \\ \hline 11,700 \end{array}$$

1. What did the student do correctly?
2. What did the student do incorrectly? Why do you think they made this error?
3. Try to solve the problem correctly. Explain your thinking.

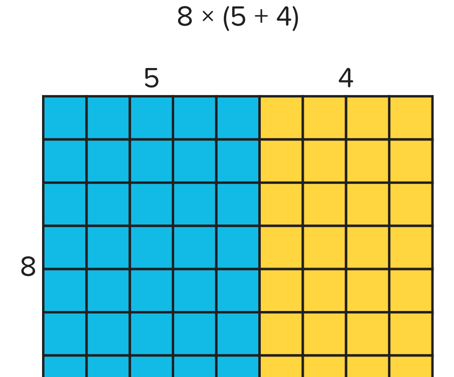
BUILD



Distributing Numbers Read the information about the Distributive Property of Multiplication. Be prepared to share your thinking or questions. Then, write and solve equations to match the area models demonstrating the Distributive Property.

Model of the Distributive Property of Multiplication The product, 8×9, can be represented by a rectangle consisting of 8 rows of 9 square units.

This problem can also be broken into two smaller rectangles.



- The rectangles show $8 \times 5 = 40$ and $8 \times 4 = 32$. These numbers are then added to recompose the rectangle: $40 + 32 = 72$.
- 8×9 is therefore equivalent to $8 \times (5 + 4)$.
- $8 \times (5 + 4)$ is an example of the Distributive Property because we are distributing, or multiplying, both numbers in the parentheses (5 and 4) by the number 8.

The Distributive Property of Multiplication allows all numbers inside parentheses to be multiplied by the number outside the parentheses.

Photo Credit: ImAAm / Shutterstock.com

1. $58 \times 42 =$ ________

	50	8
40	2,000	320
2	100	16

$(40 \times$ ________ $) + (40 \times 8) + ($ ________ $\times 50) + (2 \times$ ________ $) =$ ________

2.

	30	7
20	600	140
4	120	28

$(20 \times 30) + ($ ________ $\times$ ________ $) + ($ ________ $\times$ ________ $) + (4 \times 7) =$ ________

3.

	60	3
20	1,200	60
9	540	27

4.

	40	7
30	1,200	210
9	360	63

5. Complete the area model and evaluate:

$(40 \times 40) + (40 \times 8) + (9 \times 40) + (9 \times 8) =$ ____________.

	40	
	1,600	
9		72

Flexible Numbers Solve.

1. Here are three ways students thought to find the product: 14 × 83 . Record their work in an area model and evaluate. Remember the addends on each side must equal 83 and 14, respectively.

Mazen: $(40 \times 10) + (40 \times 10) + (40 \times 4) + (40 \times 4) + (3 \times 10) + (3 \times 4)$

	40	40	3
10			
4			

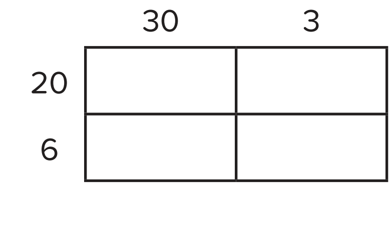
Lamiaa: $(80 \times 7) + (80 \times 7) + (3 \times 7) + (3 \times 7)$

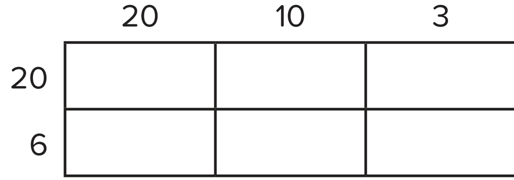
	80	3
7		
7		

Reeda: $(80 \times 10) + (80 \times 4) + (3 \times 10) + (3 \times 4)$

	80	3
10		
4		

2. Here are three ways students thought. Write an expression for each model. Then, choose one of the area models to evaluate the expression.





	11	11	11
10			
10			
6			

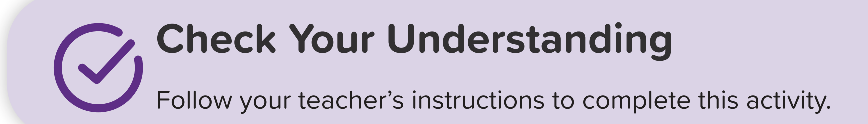
3. Create an area model and evaluate: $42 \times 34 =$ ____________.

CONNECT

Math around Egypt: The Fennec Fox Work with your teacher to read the passage. Then, use a model to solve the problem.

When a fennec fox builds a den, it can have up to 15 different entrances. How many entrances could 32 dens have?


Fennec Fox



LESSON 3

Multiplying by a 2-digit number using the algorithm



Learning Target

- I can multiply using the standard **algorithm**.



ACCESS

Mental Math Follow your teacher's directions to complete the learning activity.

1. Solve the problems mentally. You may record the products.

   35×10 $\quad$ 25×100 $\quad$ $75 \times 1{,}000$

2. Use the products from Problem 1 to find these products. You may record your results.

   35×9 $\quad$ 25×99

3. How did the products from Problem 1 help you find the products in Problem 2?

BUILD

Comparing Multiplication Models Look at the three strategies and discuss the questions with a Shoulder Partner:

- How are the strategies similar?
- How are the strategies different?
- Which strategy seems most efficient to you?

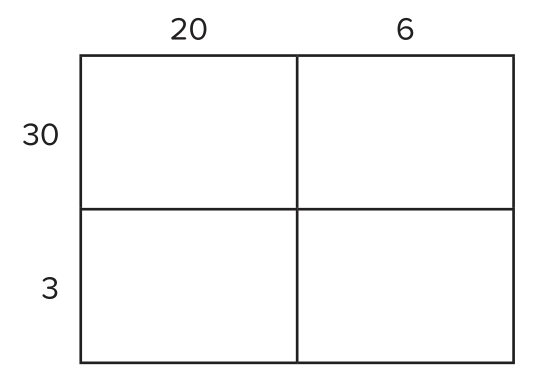
Area Model	Multiplying using distribution property	Standard Algorithm for Multiplication
40 / 5 (across top); 30 / 7 (down side) 30 row: 1,200 | 150 7 row: 280 | 35	45 x 37 = (5 x 7) + (5 x 30) + (40 x 7) + (40 x 30) = 35 + 150 + 280 + 1,200 = 1,665	1 ~~3~~ 45 × 37 315 + 1,350 1,665

How does the standard algorithm work?

- Work from bottom to top.
- Work from right to left.
- Start with the Ones place.
- Remember place value as you multiply.
- Line up the products by place value before you add them together.

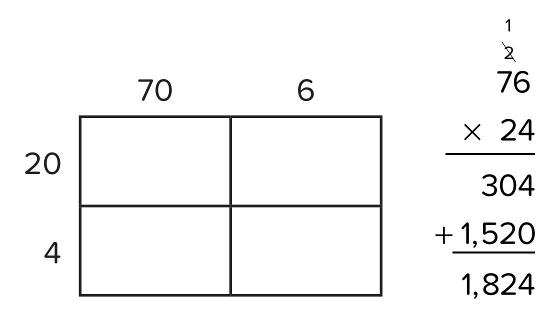
Standard Multiplication Algorithm

1. Fill in the area model.



E. Final product: ___________

2. Fill in the area model. Then, explain which parts of the area model and the standard algorithm match.



3. Find the final product.

$$\begin{array}{r} \scriptstyle 4 \\ \scriptstyle \not{4} \\ 67 \\ \times\ 76 \\ \hline 402 \\ +\ \square 69 \square \\ \hline \square \end{array}$$

4. $76 \times 82 =$ ________

5. $234 \times 53 =$ ________

6. Akram says that 34×69 will give you the same product as $(34 \times 70) - 34$. Do you agree or disagree? Why?

CONNECT

Math around Egypt: Climate in the Eastern Desert Work with your teacher to read the passage and answer the question.

The Eastern Desert usually receives less than 25 millimeters of rain per year.

Calculate the highest possible amount of rain in the Eastern Desert over a 25-year time span, Use words and numbers to explain your thinking.

Check Your Understanding

Follow your teacher's instructions to complete this activity.

LESSON 4

Multiplying Multi-Digit Numbers



Learning Targets

- I can multiply 4-digit numbers by 2-digit numbers using the standard algorithm.
- I can use estimation to check the reasonableness of my answers.



ACCESS

Error Analysis Read the problem and complete the error analysis.

Ashraf evaluated 357 × 36 using the standard algorithm. Analyze Ashraf's work. Identify what Ashraf did correctly and incorrectly, and then solve the problem.

$$
\begin{array}{r}
1 \\
\not{3}\,\not{4} \\
357 \\
\times \quad 36 \\
\hline
2{,}142 \\
+\ 10{,}521 \\
\hline
12{,}663
\end{array}
$$

1. What did Ashraf do correctly?
2. What did Ashraf do incorrectly?
3. Try to solve the problem correctly. Explain your thinking.

BUILD

More Digits, More Fun Follow your teacher's directions to complete the learning activity.

Photo Credit: Reinholds Nulle / Shutterstock.com

Match the Model Solve each problem. First, estimate and record your estimate. Then, solve using the multiplication algorithm. Finally, record the letter of the matching model.

1. $3{,}567 \times 24$

   My Estimate: ____________

   Evaluate: $3{,}567 \times 24 =$ ____________

   Matching Model Letter: ____________

2. $2{,}521 \times 74$

   My Estimate: ____________

   Solve: $2{,}521 \times 74 =$ ____________

   Matching Model Letter: ____________

3. $8{,}222 \times 53$

   My Estimate: ____________

   Evaluate: $8{,}222 \times 53 =$ ____________

   Matching Model Letter: ____________

4. $6{,}209 \times 33$

   My Estimate: ____________

   Evaluate: $6{,}209 \times 33 =$ ____________

   Matching Model Letter: ____________

Match the Model

A.

	3,000	500	60	7
20	60,000	10,000	1,200	140
4	12,000	2,000	240	28

D.

	8,000	200	20	2
50	400,000	10,000	1,000	100
3	24,000	600	60	6

B.

$$\begin{array}{r} 6{,}209 \\ \times\ 33 \\ \hline \end{array}$$

E.

	8,000	200	20	2
5	400,000	1,000	100	10
4	24,000	600	60	6

C. 215 x 22 =

(5 x 2) + (5 x 20) + (10 x 2) + 10 x 20) + (200 x 2) + (200 x 20)= .....

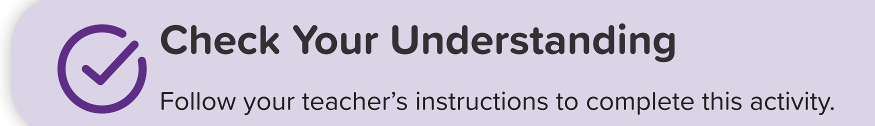
F.

	2,000	500	20	1
70	140,000	35,000	1,400	70
4	8,000	2,000	80	4

CONNECT

Writing About Math Respond to the prompt.

When multiplying multi-digit numbers, what is your preferred strategy? Explain your reasoning. You may use words and numbers to express your ideas.



Check Your Understanding

Follow your teacher's instructions to complete this activity.

LESSON 5
Multiplication Problems in the Real World



Learning Target

- I can solve multistep story problems involving multiplication.



ACCESS

Math around Egypt: Sandstorms Work with your teacher to read the passage. Then, solve the problems.

Sandstorms are caused by thunderstorms or strong air pressure. The storms can last minutes or hours. The sand and dust are transported thousands of kilometers away with winds up to 140 kilometers per hour.

If a sandstorm lasts for 120 minutes each day for 33 days in a row, how many minutes did it storm all together?

Challenge How many hours did the sandstorm last?

Photo Credit: Reinholds Nulle / Shutterstock.com

BUILD

Mona's Restaurant Follow your teacher's directions to complete the learning activity.

1. Mona has a restaurant in Al-Quesyr It is a tourist city located on the coast of the Red Sea. In February, Mona sold 402 kebabs. In March, she sold 753 kebabs. She makes each kebab with 83 grams of meat. How many grams of meat did she use in February and March?

2. Mona's son Wael makes baklava to sell at his family's restaurant. His recipe calls for 170 grams each of pistachios, walnuts, and hazelnuts. In order to make enough for the customers, he needs to multiply his recipe by 18. How many total grams of nuts will he need?

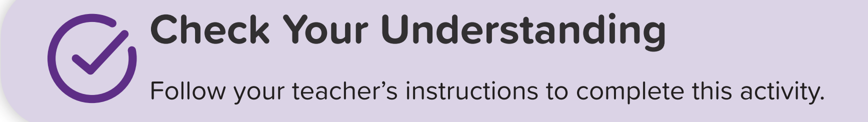
3. For Wael's baklava syrup, he needs 250 milliliters of honey, 15 mL of orange extract, and 30 mL of lemon juice per recipe. How many total milliliters of liquid ingredients will he need for the sauce if he needs to make 18 batches?

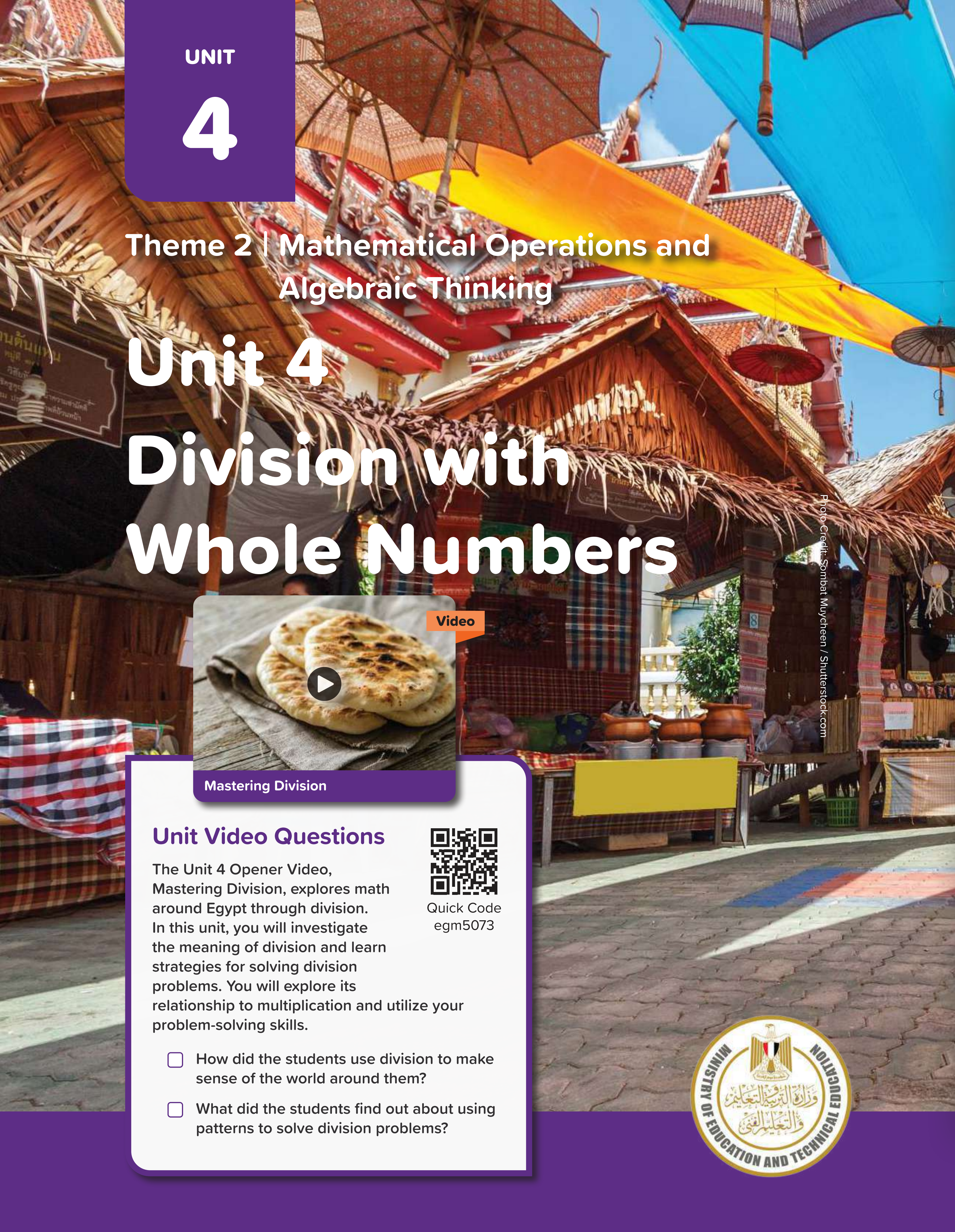
4. Mona uses 140 grams of sesame seeds to make 120 milliliters of tahini. She makes the recipe 20 times each week. How many grams of sesame seeds does she use each week? How many milliliters of tahini does she make in 36 weeks? Convert the amount in milliliters to liters.

5. Mona uses 6 lemons for each liter of lemonade. She makes 8 liters of lemonade a day. After 365 days, how many lemons has she used? How many liters of lemonade does she make in 365 days? Mona uses 1,133 grams of sugar daily. How many grams does she use in 30 weeks?

CONNECT

Writing About Math Write about three things you have learned about Egypt in school this year. Were you surprised to discover how much mathematics is around you in the real world? Why or why not?





UNIT

4

Theme 2 | Mathematical Operations and Algebraic Thinking

Unit 4 Division with Whole Numbers

Video

Mastering Division

Unit Video Questions

The Unit 4 Opener Video, Mastering Division, explores math around Egypt through division. In this unit, you will investigate the meaning of division and learn strategies for solving division problems. You will explore its relationship to multiplication and utilize your problem-solving skills.

Quick Code egm5073

- ☐ How did the students use division to make sense of the world around them?
- ☐ What did the students find out about using patterns to solve division problems?

LESSON 1

Dividing Using Area Model



Learning Target

- I can use the **area model** to solve division problems.

ACCESS

Patterns in Multiplication Complete each set of multiplication equations, and explain any patterns you noticed.

1. $3 \times 5 =$ ________

   $3 \times 50 =$ ________

   $3 \times 500 =$ ________

2. $4 \times 2 =$ ________

   $40 \times 20 =$ ________

   $400 \times 200 =$ ________

Photo Credit: saragraphika / Shutterstock.com

BUILD

Whiteboard: Using the Area Model Work with your teacher to use the area model strategy to solve the division equations.

1. $2{,}207 \div 7 =$ ________



2. $1{,}625 \div 13 =$ ________

Model Match Choose the correct area model that represents each problem and fill in any missing numbers. Then, use the area model to answer each problem.

1. $9{,}234 \div 81 =$ ________

2. $3{,}622 \div 31 =$ ________

3. $1{,}050 \div 7 =$ ________

A.

	100	10	6
31	3,622 − 3,100 522	522 − 310 212	212 − 186 26

100 + 10 + 6 = 116 R 26

B.

	100	50
______	1,050 − 700 350	350 − 350 0

100 + 50 = 150

C.

	______	______	______	______
81	9,234 − 8,100 1,134	1,134 − 810 324	324 − 162 162	162 − 162 0

______ + ______ + ______ + ______ = ______

CONNECT

Writing About Math: Error Analysis Look at the problem, and analyze the student's area model. Identify what the student did incorrectly.

Divide: 2,852 ÷ 24 = ______

Student's area model: 24) 2,852

	10	5	100	3
24	2,852 − 240 2,612	2,612 − 120 2,492	2,492 − 2,400 92	92 − 72 (20)

2,852 ÷ 24 = 20



Check Your Understanding

Follow your teacher's instructions to complete this activity.

LESSON 2

Estimating Quotients



Learning Target

- I can use estimation to check the reasonableness of my answers.

ACCESS

Mental Math Use mental math to divide.

1. $5,600 \div 70 =$ __________

2. $140 \div 20 =$ __________

3. $8,100 \div 90 =$ __________

4. $2,400 \div 80 =$ __________

5. $3,600 \div 9 =$ __________

BUILD

Compatible Numbers Estimate using compatible numbers. Then, solve using an area model.

$5,814 \div 47 =$ __________

My Estimate: __________

My Solution: __________

HANDS-ON ACTIVITY

Winner Takes All

Play the game in groups of two to practice estimating quotients.

Object: Collect all the cards.

1. Each player shuffles a deck of 12 cards and places the cards face down.
2. Each player places the top card in the center space at the same time, revealing each division problem.
3. Each player estimates the **quotient** using **compatible numbers** and then shares their **estimate** with the other player. Players should check each other's work.
4. The player with the greater estimated quotient takes both cards and adds them to the bottom of his or her own pile.
5. If there is a tie, both players turn over the next card on their piles and repeat the process. The winner of that round takes all four cards.
6. Play continues until one player has all the cards.

CONNECT

Writing About Math you have been practicing rounding, estimating, using benchmark numbers, and compatible numbers. How have you used these strategies to improve your skills as a mathematician?



Check Your Understanding

Follow your teacher's instructions to complete this activity.

LESSON 3

Using the division algorithm



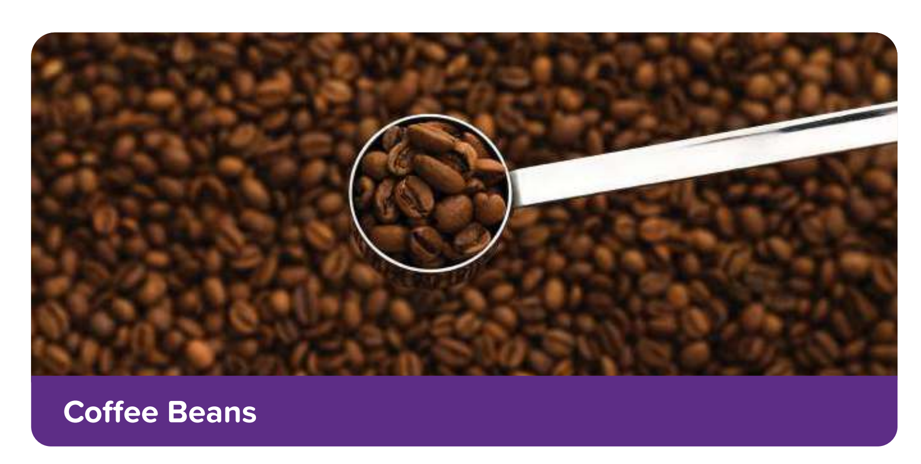
Learning Target

- I can use the standard algorithm to divide by a 2-digit **divisor**.

ACCESS

Dividing Beans Read the problem. Work with your teacher to solve the problem. Then, copy the problem and solution into your Math Notebook.

Rana owns a coffee shop. She uses 1 full scoop of coffee beans to brew one cup of coffee. Her container has __________ beans. She knows her scoop holds __________ beans. Rana wants to know how many cups of coffee she can make from this container of beans. How could Rana find out how many scoops are in this container?



Coffee Beans

BUILD

Find the Similarities Copy your teacher's solution into your Math Notebook. Discuss how the standard algorithm for division is similar to and different from the area model.

$$43\overline{)1{,}376}$$

Let's Try It Divide using the standard algorithm for division.

1. $32\overline{)192}$

3. $22\overline{)756}$

2. $65\overline{)543}$

4. $46\overline{)8,014}$

CONNECT

Making Connections Solve the problems using the standard algorithm. Check your work using an area model.

1. At her cafe, Rana sells cookies baked by a local bakery. She receives an order of 350 cookies. Rana packages the cookies in groups of 12 cookies per bag. Solve to find how many full bags, containing 12 cookies each, Rana can sell from her order of 350 cookies and how many cookies are left over.
2. How could Rana package the cookies so that each bag contains the same number of cookies and she has none left over?



Check Your Understanding

Follow your teacher's instructions to complete this activity.

LESSON 4

The relation between division and multiplication

Learning Targets

- I can use the standard algorithm to divide by a 2-digit divisor.
- I can use multiplication to check answers to division problems.



Error Analysis Ayman says that $8,858 \div 43 = 26$. Analyze Ayman's work. Do you agree or disagree with his solution? Explain your thinking.

$$\begin{array}{r} 26 \\ 43\overline{)8,858} \\ -86 \\ \hline 258 \\ -258 \\ \hline 0 \end{array}$$

BUILD



Play the game with your partner to practice checking division answers using multiplication.

1. Decide who goes first.
2. Player 1 starts with 200 and chooses a divisor from the list. Players cross out the divisor so it cannot be used again.
3. Player 1 solves the division problem and announces the solution. Example: $200 \div 17 = 11$ R13.
4. Player 2 uses multiplication and addition to check. Example: $17 \times 11 = 187$, $187 + 13 = 200$.
5. When you and your partner agree on the solution, write the equation on the record sheet. Circle the **remainder** and write Player 1's initials next to the problem.

HANDS-ON ACTIVITY

Keep the Leftovers

6. Subtract the remainder from the original **dividend** to find the new dividend for Player 2. Example: 200 – 13 = 187. The new dividend is 187.
7. Player 2 chooses from the remaining divisors and solves the division problem. Player 1 checks the solution with multiplication and addition.
8. Take turns until the starting number is 0 or until the dividend is smaller than all of the remaining divisors.
9. Both players find the sum of all their remainders. The player with the highest score wins.

Whiteboard: Keep the Leftovers Recording Sheet

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20

Starting Number	Equation	Initials
200		

Photo Credit: Lui, Tat Mun / Shutterstock.com

CONNECT

Ziad's Buttons Ziad works in a clothing factory that produces shirts. He has 100 buttons and needs 16 buttons for each shirt. After dividing, he thinks he has enough to make 6 shirts and will have 4 buttons left over. Is Ziad correct in his thinking? Why or why not? Explain your thinking.



Check Your Understanding

Follow your teacher's instructions to complete this activity.

LESSON 5

Multistep Story Problems



Learning Target

- I can solve multistep story problems involving whole numbers and the four operations.



ACCESS

Making Sense of Remainders Read the story problem, and look at the student work. Use the information provided to answer the question. Be prepared to justify your thinking.

1. A baker made 140 servings of baklava for a party. If each baking tray holds 12 servings of baklava, how many trays will be needed to hold all the baklava?

```
   11  R 8
2)140
 - 12
   20
 - 12
    8
```

Photo Credit: Lui, Tat Mun / Shutterstock.com

2. Mom baked a batch of 12 balah el sham. Two balah el sham fell on the floor, leaving 10 on the platter. If 4 kids split the remaining balah el sham equally, how many balah el sham will each child get?

```
  12          2  R 2
 - 2       4)10
  10        - 8
              2
```

BUILD

Step by Step Read through the following problems and follow the prompts from your teacher.

1. In one year, a textile factory used 11,650 meters of cotton, 4,950 fewer meters of silk than cotton, and 3,500 fewer meters of wool than silk. How many meters of fabric were used in all?

2. An architect is designing a bridge. The architect has two choices for materials. Mighty Steel sells 5 metric tons (t) of steel for 100,000 LE. Silver Strong Steel sells 3 t of steel for 70,000 LE.

   If the architect needs 15 t of steel, how much money will be saved by purchasing from Mighty Steel?

Solving Multistep Problems Work with your group to solve each problem.

1. Computer Depot sold 762 reams of paper. Paper Palace sold 3 times as much paper as Computer Depot and 143 reams more than Office Supply Central. How many reams of paper were sold by all three stores combined?

2. Zeinab ordered 12 packages of fabric squares to make a quilt. Each package has 18 fabric squares, and Zeinab used all the squares for her quilt. Reem made a quilt that was 13 squares wide by 13 squares long. How many fewer squares did Reem use than Zeinab for her quilt?

3. Nagi sold a total of 30 boxes of sports T-shirts at his store on Monday. These boxes contained only basketball T-shirts and football T-shirts. Each box contained 25 sports T-shirts. He earned 3 LE for each sports T-shirt he sold. He earned a total of 1,134 LE from the football T-shirts he sold. How much money did Nagi earn from the basketball T-shirts he sold?

4. Malek and his family are going on a road trip to his grandmother's house, which is 465 kilometers away. On Friday, they travel 124 km. On Saturday, they traveled 210 km. How many kilometers will they need to travel on Sunday to reach his grandmother's house?

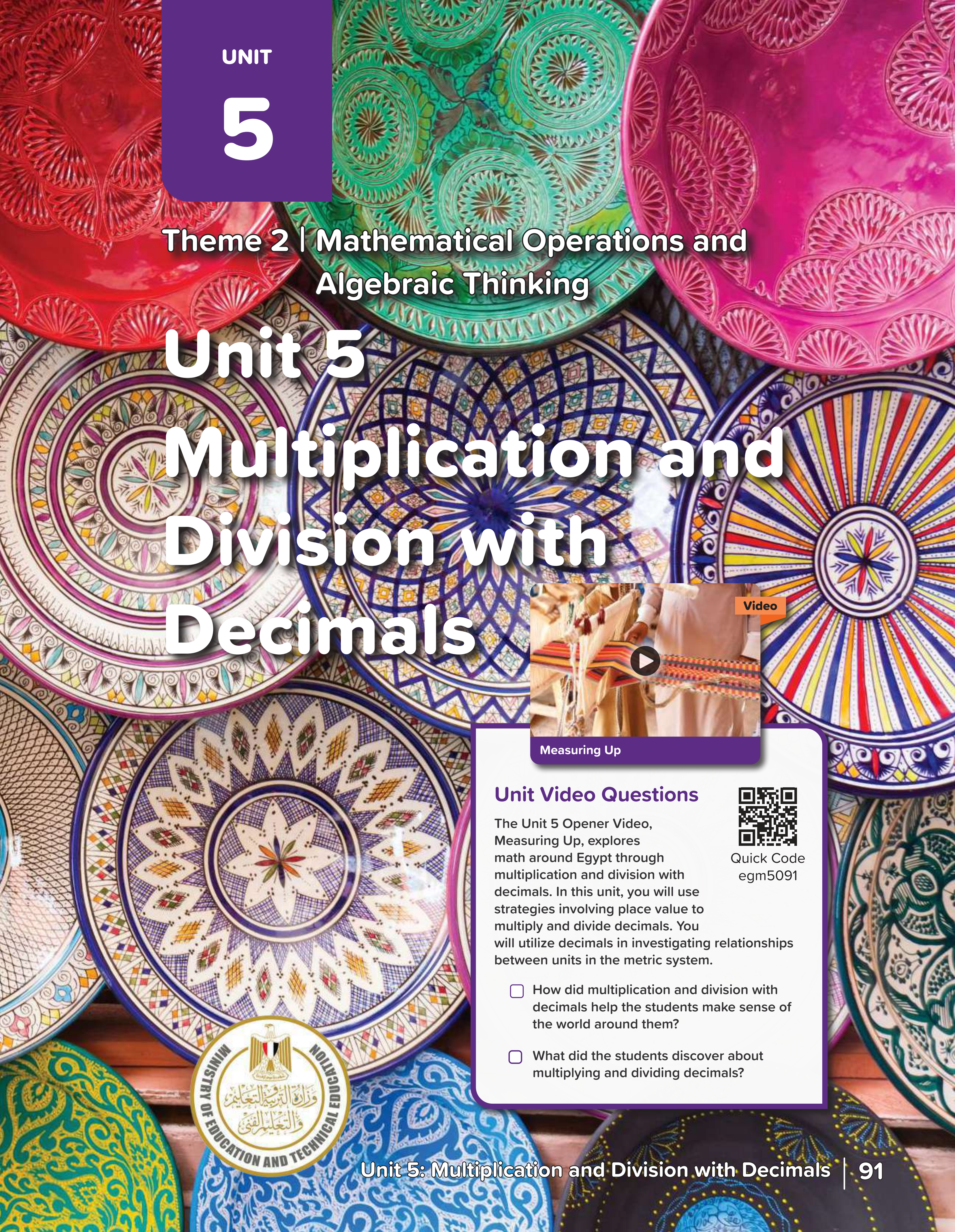
CONNECT

Writing About Math What strategies are helpful in being a strategic and flexible problem solver?



Check Your Understanding

Follow your teacher's instructions to complete this activity.



Theme 2 | Mathematical Operations and Algebraic Thinking

Unit 5 Multiplication and Division with Decimals

Unit Video Questions

Quick Code egm5091

The Unit 5 Opener Video, Measuring Up, explores math around Egypt through multiplication and division with decimals. In this unit, you will use strategies involving place value to multiply and divide decimals. You will utilize decimals in investigating relationships between units in the metric system.

- ☐ How did multiplication and division with decimals help the students make sense of the world around them?
- ☐ What did the students discover about multiplying and dividing decimals?

LESSON 1
Multiplying by Powers of Ten



Learning Target

- I can explain patterns when multiplying by 10 , 100 and 1000
- I can explain patterns when multiplying by 0.1 , 0.01 and 0.001 .

ACCESS

Missing Numbers Fill in the missing numbers in each equation.

1	10	100	1,000	10,000	100,000

1. $496 = 4 \times$ (A) $+ 9 \times$ (B) $+ 6$
2. $6{,}140 = 6 \times$ (C) $+ 1 \times$ (D) $+ 4 \times$ (E)
3. $20{,}403 = 2 \times$ (F) $+ 4 \times$ (G) $+ 3$
4. $78{,}594 = 7 \times$ (H) $+ 8 \times$ (I) $+ 5 \times$ (J) $+ 9 \times$ (K) $+ 4$
5. $8{,}032 \times 1{,}000 =$ (L)

Photo Credit: Sun_Shine / Shutterstock.com

BUILD

Looking for Patterns Look at the examples in Set 1.

Set 1

Examples	Products in Standard Form
3 × 2 Thousands = 6 Thousands	6,000
3 × 2 Hundreds = 6 Hundreds	600
3 × 2 Tens = 6 Tens	60
3 × 2 Ones = 6 Ones	6
3 × 2 Tenths = 6 Tenths	0.6
3 × 2 Hundredths = 6 Hundredths	0.06
3 × 2 Thousandths = 6 Thousandths	0.006

Now fill in the blanks for Set 2.

Set 2

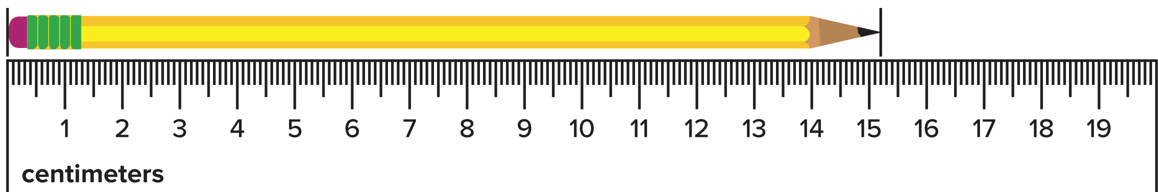
1. $25 \times 1{,}000 =$ ______________
2. $25 \times 100 =$ ______________
3. $25 \times 10 =$ ______________
4. $25 \times 1 =$ ______________
5. $25 \times 0.1 =$ ______________
6. $25 \times 0.01 =$ ______________
7. $25 \times 0.001 =$ ______________

(Hint: What could you call the second factor in these problems?)

Pencil Problem Look at the diagram of Manal's pencil. Read the passage and answer the questions.

Manal works as an accountant helping businesses keep track of their income and expenses. Doing all this accounting wears down Manal's pencils quickly.





Answer the questions about Manal's pencil.

1. Manal's pencil is __________ centimeters long.
2. If her pencil were 10 times bigger, it would be __________ centimeters long.

   (pencil length $\times$ 10 = __________ cm)
3. If Manal were to line up 100 of the same pencils, the total length would be

   __________ centimeters.

   (pencil length $\times$ 100 = __________ cm)

4. If Manal's pencil were to shrink to one tenth of its current length, it would be ________ centimeters long.

(pencil length × 0.1 = ________ cm)

Let's Try It Evaluate.

1. $4.2 \times 10 =$ ____________
2. $360 \times 0.1 =$ ____________
3. $7.4 \times 0.01 =$ ____________
4. $1.245 \times 100 =$ ____________
5. $602.1 \times 0.01 =$ ____________
6. $14.14 \times 0.1 =$ ____________

Let's Try More Evaluate.

Multiply to complete the table.

	1.	2.	3.
×	3	30	300
0.001	A. ________	G. ________	M. ________
0.01	B. ________	H. ________	N. ________
0.1	C. ________	I. ________	O. ________
1	D. ________	J. ________	P. ________
10	E. ________	K. ________	Q. ________
100	F. ________	L. ________	R. ________

CONNECT

Hoda's Stride Hoda's stride is 0.72 meters. How far, in meters, will Hoda walk after taking 1,000 paces? Use words and numbers to explain how you found your answer.



Check Your Understanding

Follow your teacher's instructions to complete this activity.

LESSON 2

Multiplying Decimals by Whole Numbers



Learning Target

- I can multiply a decimal by a whole number.

ACCESS

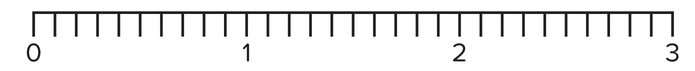
Multiplying Whole Numbers Complete the equations.

1. $773 \times 2 =$
2. $521 \times 9 =$
3. $385 \times 43 =$
4. $108 \times 26 =$
5. $497 \times 85 =$

BUILD

Let's Try It Model the expressions. Then, rewrite each problem vertically and evaluate.

1. 0.3×3



2. 0.3×4



3. 0.3×5



4. 2.5×3
5. 0.35×5



Make the Greatest Product

Play the game with your partner.

- Player 1 spins the spinner. Both players record the digit in one of the boxes. (Players should record the digits in different boxes.)
- Player 2 spins and both players record the digit.
- Take turns until all of the boxes are filled. You may not move a digit once it has been written.

Photo Credit: Sun_Shine / Shutterstock.com



Make the Greatest Product

- Players solve the multiplication problem they formed. The player with the greatest product wins the round.

Whiteboard: Make the Greatest Product Use the Whiteboard to create and solve multiplication problems.

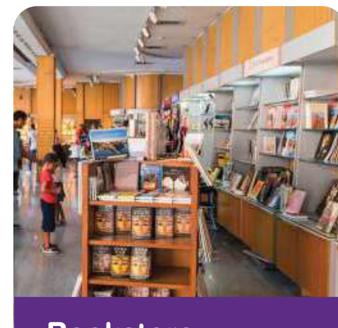
Make the Greatest Product

Round	Problem	Product
1.	□ . □ × □	
2.	0 . □□ × □	
3.	□ . 0 □ × □	
4.	□ . □□ × 4	
5.	5 . □□ × □	
	Total →	□

Challenge Add the sum of your products. The player with the greatest sum is the champion.

CONNECT

Math at Work Ameen owns a bookstore. He uses multiplication to calculate how much he earned from selling items at his store. Sometimes, he has difficulty knowing where to place the decimal point in the product. Write an explanation to help Ameen. Use words and numbers to support your thinking.


Bookstore



Check Your Understanding

Follow your teacher's instructions to complete this activity.

LESSON 3

Multiplying Tenths by Tenths



Learning Targets

- I can use models to represent multiplying decimals.
- I can explain patterns when multiplying tenths by tenths.

ACCESS

The Debate Read the story. Choose the student you think is correct. Use words and numbers to explain your thinking.

Asked teacher asked them what place value the product for decimal numbers in they multiplied two numbers in the Tenths place, such as 0.5 and 0.7.

Kamal said the Tenths place because multiplication makes numbers greater. So Tenths times Tenths would be adding a lot of Tenths together.

Nadia said the Hundredths place, because the product of two numbers in the Tenths place would have a product in the Hundredths place.

Who do you think is correct? Explain your thinking.

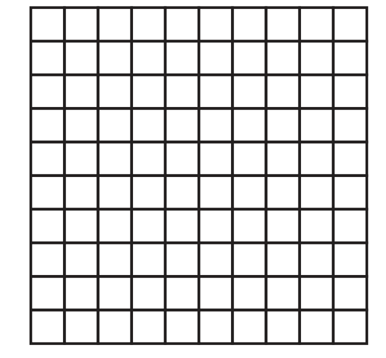
Photo Credit: Sun_Shine / Shutterstock.com

BUILD

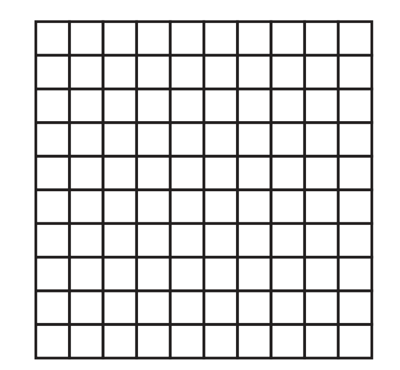
Multiplying with Arrays Work with your teacher to explore multiplying decimals with arrays.

Exploring with Tenths Use the Base 10 grids to find the products.

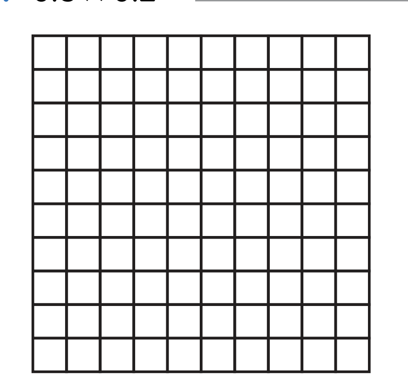
1. $0.1 \times 0.1 =$ __________



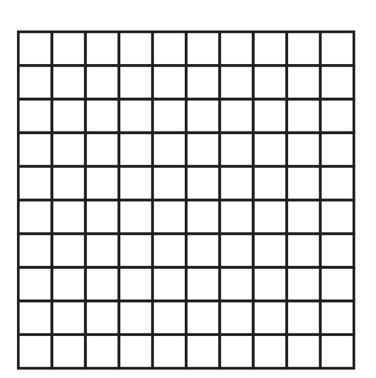
2. $0.3 \times 0.4 =$ __________



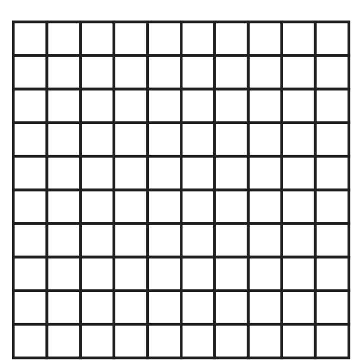
3. $0.5 \times 0.2 =$ ______________



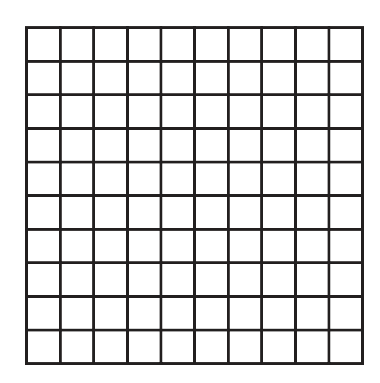
5. $0.9 \times 0.5 =$ ______________



4. $0.7 \times 0.8 =$ ______________



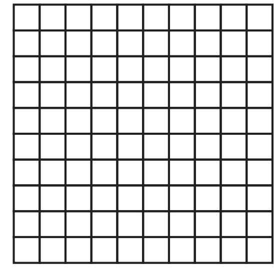
6. $0.5 \times 0.6 =$ ______________

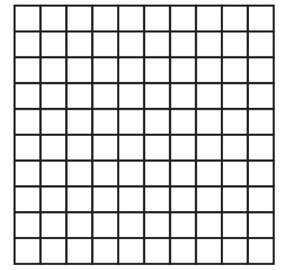


CONNECT

Writing About Math Your friend was absent and missed today's math lesson. Explain why the product is in the Hundredths when multiplying Tenths by Tenths. Use Whiteboard: Base 10 Grids or create two grids in your journal to provide an example to help your friend understand the concept.

Whiteboard: Writing About Math Use the given Base 10 grids or create two grids in your journal for use in the next task.





Check Your Understanding

Follow your teacher's instructions to complete this activity.

LESSON 4

Multiply decimals using the area model



Learning Target

- I can use the **area model** to multiply decimals.

ACCESS

Extending Multiplication Patterns Look for patterns in each set of problems. Use the patterns to complete the unanswered problems.

1. $80 \times 3 = 240$

$8 \times 30 = 240$

$8 \times 3 =$ ___________

$0.8 \times 3 =$ ___________

$8 \times 0.3 = 2.4$

$0.8 \times 0.3 =$ ___________

$0.08 \times 0.3 =$ ___________

$0.8 \times 0.03 =$ ___________

$0.08 \times 0.03 =$ ___________

2. $7 \times 600 = 4{,}200$

$7 \times 60 =$ ___________

$7 \times 6 = 42$

$7 \times 0.6 =$ ___________

$7 \times 0.06 = 0.42$

$0.7 \times 0.6 =$ ___________

$0.7 \times 0.06 =$ ___________

$0.07 \times 0.06 =$ ___________

Photo Credit: Sun_Shine / Shutterstock.com

BUILD

Area Model Puzzles Look at the area models. Some of the numbers are missing. Use the information provided to fill in the blanks.
Write the problem, and then find the product. Be prepared to share your reasoning or strategy for finding what was missing in each diagram.

1.

	20	8
50	1,000	?
?	80	32

Product: ______________

2.

	?	6
60	1,200	360
?	80	24

Product: ______________

Decimal Area Models Use an area model to complete each problem.

1. $1.3 \times 6.8 =$ ________

5. $5.7 \times 9.1 =$ ________

2. $29.3 \times 0.34 =$ ________

6. $18.2 \times 2.8 =$ ________

3. $4.2 \times 5.6 =$ ________

6. $3.55 \times 0.75 =$ ________

4. $7.3 \times 0.49 =$ ________

7. $70.9 \times 4.6 =$ ________

CONNECT

Math at Work Malak works for a construction company. The company had 12 pallets of cinder blocks delivered for a building project. Each pallet weighed 1.36 metric tons.

Help Malak revise and complete the area model to figure out how much the cinder blocks weighed all together. If necessary, place a decimal point in the partial products. Use estimation to explain why your answer is reasonable.

	1	0.3	0.06
10	10	30	6
2	2	6	12



Check Your Understanding

Follow your teacher's instructions to complete this activity.

LESSON 5

Multiplying Decimals through the Hundredths Place



Learning Targets

- I can use the standard algorithm to multiply decimals through the Hundredths place.
- I can use estimation to check the reasonableness of my answers.

ACCESS


Measuring Blood Pressure

Place the Decimal Point Math is important to doctors. Doctors must be precise in their calculations and measurements, especially when prescribing medicine for their patients. Misplacing a decimal point can be problematic.

Photo Credit: Sun_Shine / Shutterstock.com

The digits of the product for each problem have been provided, but the decimal point is missing. Without multiplying, use your reasoning to place the decimal point correctly in the product.

1. $5.8 \times 7.4 =$ ________

   4,292

2. $32.4 \times 5.3 =$ ________

   17,172

3. $11.68 \times 2.4 =$ ________

   28,032

4. $15.4 \times 0.49 =$ ________

   7,546

BUILD

Same and Different Review both completed problems shown. Identify what is the same and what is different in the problems. Be prepared to share your thinking with the class.

$$\begin{array}{r} \overset{2}{4}3 \\ \times\ 18 \\ \hline 344 \\ +\ 430 \\ \hline 774 \end{array} \qquad \begin{array}{r} \overset{2}{4}.3 \\ \times\ 0.18 \\ \hline 344 \\ +\ 430 \\ \hline 0.774 \end{array}$$

Using the Standard Algorithm for Decimal Numbers Find the product for each multiplication problem using the standard algorithm.

1. 29.35×3.4

2. 43.2×0.24

3. 2.43×6.9

4. 12.87×7.3

5. 8.92×0.17

6. 1.74×35

7. 10.21×0.64

8. 47.8×5.2

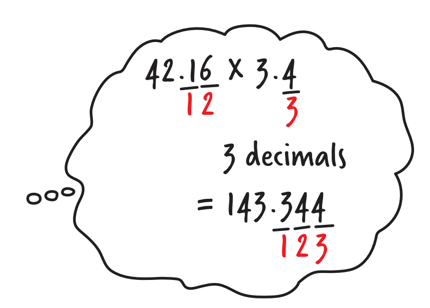
CONNECT

Writing About Math Two students are having a discussion based on the student work shown here. Read their discussion and respond to the prompt.

Estimate	Standard algorithm
42.16 × 3.4	42.16 × 3.4
	16864
	126480
estimate	
42 x 3 = 126	143.344

Dalal: I know the student placed the decimal correctly because 143.344 is close to her estimate of 126.

Doha: I know she placed the decimal correctly because the final product has three decimal places and there are three decimal places altogether in both factors of the problem.



Do you agree with Dalal or Doha? Can you count decimal places in the factors to place the decimal in the product? Explain your thinking.



Check Your Understanding

Follow your teacher's instructions to complete this activity.

LESSON 6

Multiplying Decimals through the Thousandths Place



Learning Targets

- I can use the standard algorithm to multiply decimals through the Thousandths place.



ACCESS

Place the Decimal Points Math is important to architects. Architects draw blueprints to design buildings that are safe and beautiful. Misplacing a decimal point can cause problems during construction.

The correct product for each problem has been given. Without multiplying, use reasoning to place the decimal point correctly in one or both factors. More than one correct answer is possible.

1. $38 \times 64 = 24.32$

2. $532 \times 17 = 9.044$

3. $18 \times 145 = 261$

4. $826 \times 43 = 3{,}551.8$

BUILD

Making Sense of the Standard Algorithm Use the standard algorithm to find the products.

1. $\begin{array}{r} 7.184 \\ \times\ 6.3 \\ \hline \end{array}$

2. $\begin{array}{r} 2.607 \\ \times\ 41 \\ \hline \end{array}$

3. $\begin{array}{r} 5.328 \\ \times\ 7.9 \\ \hline \end{array}$

4. $\begin{array}{r} 8.108 \\ \times\ 0.45 \\ \hline \end{array}$

5. $\begin{array}{r} 6.429 \\ \times\ 1.9 \\ \hline \end{array}$

6. $\begin{array}{r} 8.375 \\ \times\ 20 \\ \hline \end{array}$

CONNECT

Writing About Math Reflect on the Essential Question: How does understanding place value help to multiply decimals more efficiently?



Check Your Understanding

Follow your teacher's instructions to complete this activity.

LESSON 7

Decimals and the Metric System



Learning Targets

- I can explain relationships between the metric system and decimals.
- I can use decimals to represent **equivalent** measurements.



ACCESS

What Would You Use? Look at each image. Select the most appropriate unit of measurement from the given terms to measure the length of each object. Then, answer the question.

millimeters	centimeters	meters	kilometers

1. Pencil: Unit of measure ____________________
2. Height of building: Unit of measure ____________________
3. Length of dinner table: Unit of measure ____________________
4. Length of the Nile River: Unit of measure ____________________



5. Length of insect: Unit of measure ____________________
6. Describe the relationship between millimeters, centimeters, meters, and kilometers.



BUILD

Back-to-Back, Front-To-Front Follow your teacher's directions to play Back-to-Back, Front-to-Front with your classmates.

Metric Measurements as Decimals Complete the chart. Use whole numbers and decimals to write equivalent measurements.

1. Measurements for Length

Unit of Measurement	In Millimeters	In Centimeters	In Meters
Millimeter	1		
Centimeter		1	
Meter			1

2. Measurements for Mass

Unit of Measurement	In Grams	In Kilograms
Gram	1	
Kilogram		1

3. Measurements for Capacity

Unit of Measurement	In Milliliters	In Liters
Milliliter	1	
Liter		1

Metric Match Select the equivalent measurement.

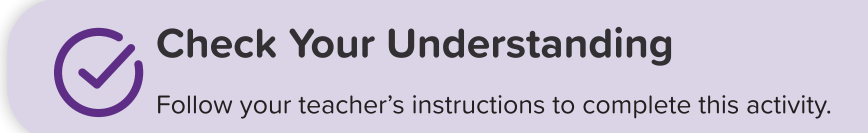
1.	10,870 g = ______________ kg	1,087	108.7	10.87	1.087
2.	3,465 mL = ______________ L	0.3465	3.465	34.65	346.5
3.	22 cm = ______________ m	2,200	220	2.2	0.22
4.	0.7 m = ______________ cm	7	70	700	7,000
5.	17.6 kg = ______________ g	0.176	1.76	1,760	17,600
6.	95 mm = ______________ cm	9.5	950	9,500	95,000
7.	19,629 mL = ______________ L	1,962.9	196.29	19.629	1.9629
8.	3.3 m = ______________ cm	33	330	3,300	33,000
9.	700 g = ______________ kg	7,000	70	7	0.7
10.	694 mm = ______________ cm	6,940	69.4	6.94	0.694
11.	2.5 L = ______________ mL	2,500	250	25	0.25
12.	7.8 cm = ______________ 78 mm	0.078	0.78	78	780

CONNECT

Math at Work Yousra is a veterinarian. She needs to weigh a cat to see if it is healthy.

Yousra records that the cat weighs 3.648 kilograms. Her assistant records that the cat weighs 3,648.0 grams.

Do you agree with Yousra or her assistant? Why?



Check Your Understanding

Follow your teacher's instructions to complete this activity.

LESSON 8

Measurement, Decimals, and Powers of Ten



Learning Target

- I can relate converting measurements in the metric system to multiplying by powers of ten.

ACCESS

Powers of Ten Complete each equation. Discuss the difference between powers of 10 and multiples of 10.

1. $425 \times 10 =$ ______
2. $3.7 \times 100 =$ ______
3. $0.94 \times 0.1 =$ ______
4. $425 \times$ ______ $= 0.425$
5. $3.7 \times$ ______ $= 0.37$
6. $0.94 \times$ ______ $= 940$
7. ______ $\times 1{,}000 = 1{,}800$
8. ______ $\times 0.1 = 0.6512$
9. ______ $\times 100 = 89.3$

BUILD

Converting Measurements Use multiplication and powers of 10 to convert the measurements.

1. Amgad is a weightlifter. He needs to drink about 4,230 milliliters of water every day. How many liters of water does he need? Select the multiplication problem that could be used to answer the question.

   A. $4{,}230 \times 1{,}000$
   B. $4{,}230 \times 100$
   C. $4{,}230 \times 0.01$
   D. $4{,}230 \times 0.001$

2. 142 centimeters = ? meters

   142 cm × ____________ = ____________ m

3. 317 kilograms = ? grams

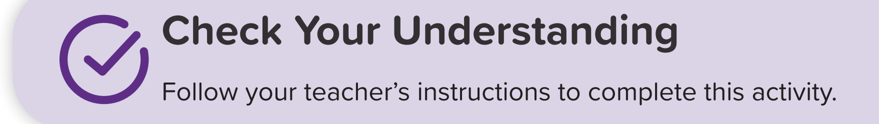
   317 kg × ____________ = ____________ g

Identify the Correct Conversion Study each problem. In each problem, mark whether the multiplication given to complete the conversion is correct. Select Y for yes and N for no. Then, complete all conversions by filling in each blank with the equivalent measurement (even if the conversion is incorrect).

A. 0.007 kg = ______ g 0.007 × 1,000 Y / N	G. 4 cm = ______ m 4 × 0.01 Y / N	M. 1.5 m = ______ cm 1.5 × 0.01 Y / N	T. 0.8 cm = ______ mm 0.8 × 0.1 Y / N
B. 51 mm = ______ cm 51 × 10 Y / N	H. 500 mL = ______ L 500 × 1,000 Y / N	N. 6,410 cm = ______ m 6,410 × 0.01 Y / N	U. 10.3 m = ______ cm 10.3 × 0.01 Y / N
C. 230 cm = ______ m 230 × 0.01 Y / N	I. 5.67 m = ______ cm 5.67 × 10 Y / N	P. 6,410 m = ______ km 6,410 × 0.001 Y / N	V. 9,320 mm ______ cm 9,320 × 10 Y / N
D. 4,800 mL = ______ L 4,800 × 0.1 Y / N	J. 782 mm = ______ cm 782 × 10 Y / N	Q. 350 cm = ______ m 350 × 0.01 Y / N	W. 9,320 cm = ______ m 9,320 × 0.01 Y / N

CONNECT

Math at Work There are two categories of weightlifting: the Snatch and the Clean and Jerk. World Champion Egyptian weightlifter Mohamed Ehab wants to compare his personal best in these two categories. In the Snatch, he was able to lift 173 kilograms. He was able to lift 201,000 grams in the Clean and Jerk. Use multiplication and powers of 10 to explain which measurement is greater.



LESSON 9
Solving Multistep Story Problems



Learning Target

- I can solve multistep story problems involving addition, subtraction, and multiplication of decimals.

ACCESS

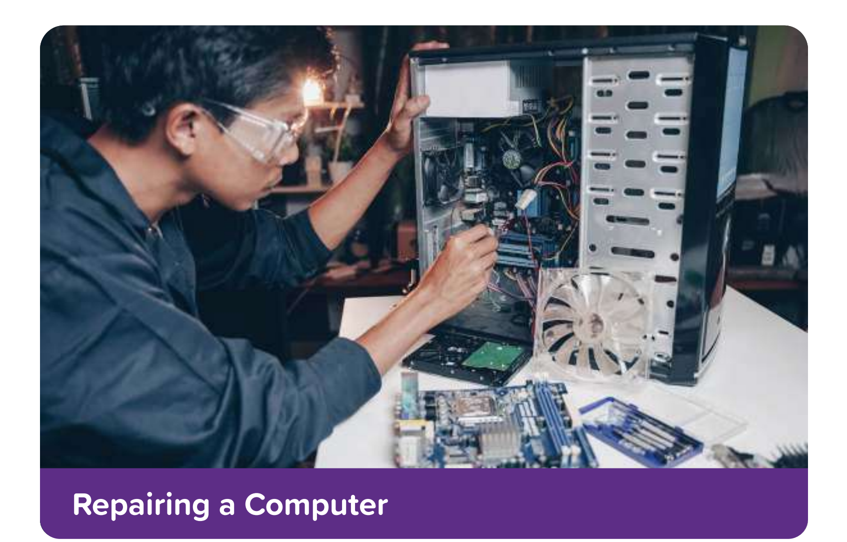
Write a Story Problem Write a story problem for 342×0.001. Your problem must include a measurement conversion, so be sure to include the units in your scenario.

BUILD

What Do You Know? Read each story problem. Discuss with your partner how to solve each problem. Once you agree on a plan, work together to answer the question. Be sure to label your answers with the correct unit of measure.

1. Marwan is a computer engineer. The computer he is repairing is currently in three pieces that have a mass of 2 kilograms, 600 grams, and 0.03 kg. His manager is waiting for the last piece, which has a mass of 1,750 g, to arrive. What will the mass of the computer be when it is completely assembled?

____



Repairing a Computer

2. Ehab's twin sister Eman also wants to know how much she grew. In January, she was 1.34 meters. At the end of the year, she was 145 centimeters. Who grew more—Ehab or Eman? _______________ How much more? _______________

3. Dalia made a liter of sugar cane juice. She drank 320 milliliters. Her father drank 0.25 liters. How much sugar cane juice is remaining? _______________

4. Ehab wants to know how much he has grown this year. In January, he was 138.2 centimeters. By the end of the year, he was 1.5 meters tall. How much did Ehab grow this year? _______________

5. Rania is a nurse in a hospital. She is getting wrap bandages from the storage closet for her patients. She needs 1.35 meters of bandages for each of her 4 patients. There are 250 centimeters in each package. How many packages does she need? _______________

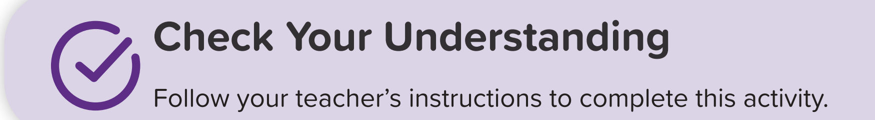
   How many, if any, will be left over? _______________

Photo Credit: Sun_Shine / Shutterstock.com

CONNECT

Math at Work Read the story problem. Record your problem-solving plan. Use words, numbers, or pictures to explain how to solve the problem.

Marwan is designing a new circuit board for the computer he is repairing. The old circuit board measured 7.25 centimeters by 36 millimeters. He planned for the new circuit board to be 80 mm by 5.5 cm. What is the difference in area of the circuit boards?



LESSON 10

Dividing by Powers of Ten



Learning Target

- I can explain patterns I notice when dividing by powers of 10.

ACCESS

Division Practice Use any division strategy to find the quotients.

1. 515 ÷ 5 = ______________
2. 690 ÷ 7 = ______________
3. 2,402 ÷ 21 = ______________
4. 812 ÷ 13 = ______________
5. 7,633 ÷ 32 = ______________

BUILD

Dividing by Powers of Ten Complete each division problem mentally. Look for patterns to predict the placement of the decimal point.

1. 2,500 ÷ 100 = ______________
2. 2,500 ÷ 10 = ______________
3. 2,500 ÷ 1 = ______________
4. 2,500 ÷ 0.1 = ______________
5. 2,500 ÷ 0.01 = ______________
6. 2,500 ÷ 0.001 = ______________

Challenge 2,500 ÷ 1,000 = ______________

Fill It In Use the patterns you have just discovered to complete the division.

1. $800 \div 100 =$ ________

   $800 \div 10 =$ ________

   $800 \div 1 =$ ________

   $800 \div 0.1 =$ ________

   $800 \div 0.01 =$ ________

2. $6{,}700 \div 1{,}000 =$ ________

   $6{,}700 \div 100 =$ ________

   $6{,}700 \div 10 =$ ________

   $6{,}700 \div 1 =$ ________

   $6{,}700 \div 0.1$ ________

   $6{,}700 \div 0.01 =$ ________

3. $32 \div 10 =$ ________

4. $5.7 \div 0.1 =$ ________

5. $5.7 \div 100 =$ ________

6. $2.16 \div 0.01 =$ ________

7. $71 \div 1{,}000 =$ ________

8. $12.8 \div 0.01 =$ ________

9. $0.4 \div 10 =$ ________

10. $0.4 \div 0.001 =$ ________

11. $29.08 \div 0.1 =$ ________

12. $102.3 \div 0.01 =$ ________

CONNECT

How Hot? Temperatures must reach at least 1,100℃ for glass to be blown or for earthenware clay to harden. Water boils at about one-tenth of that temperature. Select the choice that is closest to the temperature at which water boils.

A. $1{,}100 \times 10$ B. $1{,}100 \div 10$ C. $1{,}100 \times 0.1$ D. $1{,}100 \div 0.1$

Check Your Understanding

Follow your teacher's instructions to complete this activity.

LESSON 11

Patterns and Relationships in Powers of Ten



Learning Target

- I can make connections between multiplying and dividing by powers of ten.



ACCESS

Human Equations Follow your teacher's directions to create and solve multiplication and division problems with your classmates.

BUILD

The Answer Is . . . Your teacher will assign you to a group. Evaluate the expressions in the set for your assigned group. Think about how you knew which way to move the decimal point.

Group 1	Group 2
510.05 × 0.001 = ________	510.05 ÷ 0.001 = ________
510.05 × 0.01 = ________	510.05 ÷ 0.01 = ________
510.05 × 0.1 = ________	510.05 ÷ 0.1 = ________
510.05 × 10 = ________	510.05 ÷ 10 = ________
510.05 × 100 = ________	510.05 ÷ 100 = ________
510.05 × 1,000 = ________	510.05 ÷ 1,000 = ________

Photo Credit: Shutterstock.com

Same Answer, Inverse Operation Complete each equation with the correct power of 10. Be sure to look carefully at the given operation.

1. 14.6 × ________ = 146 14.6 ÷ ________ = 146
2. 387.23 × ________ = 3.8723 387.23 ÷ ________ = 3.8723
3. 9.102 × ________ = 910.2 9.102 ÷ ________ = 910.2
4. 65 × ________ = 6,500 65 ÷ ________ = 6,500
5. 0.39 × ________ = 0.039 0.39 ÷ ________ = 0.039
6. 0.75 × ________ = 750 0.75 ÷ ________ = 750

7. 28.4 × ________ = 0.284 28.4 ÷ ________ = 0.284

8. 150.8 × ________ = 150,800 150.8 ÷ ________ = 150,800

Metric Conversions with Multiplication and Division Complete each conversion. Then, write a multiplication equation and a division equation with the same answer.

Example: 357 cm = 3.57 m 357 × 0.01 = 3.57 357 ÷ 100 = 3.57

1. 712 mL = ________ L

   712 × ________ = ________

   712 ÷ ________ = ________

2. 23 m = ________ cm

   23 × ________ = ________

   23 ÷ ________ = ________

3. 300 g = ________ kg

   300 × ________ = ________

   300 ÷ ________ = ________

4. 5,200 mm = ________ m

   5,200 × ________ = ________

   5,200 ÷ ________ = ________

5. 5,200 mm = ________ cm

   5,200 × ________ = ________

   5,200 ÷ ________ = ________

Photo Credit: Shutterstock.com

CONNECT

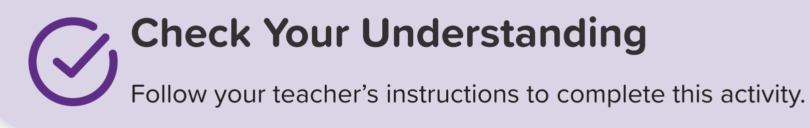
Math at Work Nour is making a new drink to sell at his juice stall by combining mango juice, orange juice, and guava juice. Look at the recipe to help him decide which container you think he should use to mix his new drink. Explain your choice using multiplication and division.

2,250 mL of mango juice

0.95 L of orange juice

650 mL of guava juice

Identify the container you think it is best for Nour to use: 3 L 4 L 5 L



LESSON 12

Dividing Decimals by Whole Numbers



Learning Targets

- I can use the standard algorithm to divide decimals through the Thousandths place.

ACCESS

What Does the Remainder Mean? Use the standard algorithm for division to find the quotients.

1. An electrician has a wire of 150 m. He wants to divide it into 40 parts of equal length, such that the length of each part is a whole number.
   What is the length of one part? How many meters will be left?
2. The city council planted trees on a side of a 2,050-meter road. If 75 trees are planted at equal distances, such that the distance between each two trees represents a whole number. What is the distance between each two trees? and what is the remaining distance?

BUILD

Getting Rid of Remainders Use the standard algorithm to find the quotients. (Note: The quotient is a decimal) Check your answer for reasonableness.

1. An electrician has a wire of 150 m. He wants to divide it into 40 parts of equal length. What is the length of one part?
2. The city council planted trees on a side of a 2,050-meter road. If 75 trees are planted at equal distances. What is the distance between each two trees?
3. Emad, the electrician, has 4.5 meters of wire that is cut into 30 pieces that are all the same length. Find the length of each piece of wire.

1. $9\overline{)121.1}$

2. $5\overline{)51.65}$

3. $16\overline{)62.24}$

4. $6\overline{)73.02}$

5. $30\overline{)589.5}$


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CONNECT

No Hibiscus Left Over Read the problem carefully. Then, use the standard algorithm for division to find the quotients.

Dalia wants to pour 20 liters of hibiscus equally into 50 cups. How much hibiscus (in liters) will be in each cup?


Hibiscus Leaves

Check Your Understanding

Follow your teacher's instructions to complete this activity.

LESSON 13
Dividing Decimals by Decimals



Learning Target

- I can use the standard algorithm to divide decimals through the Thousandths place.

ACCESS

Missing Numbers Complete each equation by choosing from the given values. Choices may be used more than one time or not at all.

3	10	12	30	100	120	300	1,200

1. $15 \div$ ________ $= 5$
2. $150 \div$ ________ $= 5$
3. $1,500 \div$ ________ $= 5$
4. $144 \div$ ________ $= 12$
5. $1,440 \div$ ________ $= 12$
6. $14,400 \div$ ________ $= 12$
7. $0.3 \times$ ________ $= 3$
8. $0.14 \times$ ________ $= 14$
9. $6.09 \times$ ________ $= 609$
10. $157.4 \times$ ________ $= 1,574$
11. $0.07 \times$ ________ $= 7$
12. $4.9 \times$ ________ $= 49$

Photo Credit: Shutterstock.com

BUILD

Make It a Whole Number Work with your teacher to complete each division problem. Estimate the quotients. Then, use the standard algorithm for division to find the quotient.

1. $2.2\overline{)26.4}$ Quotient: ________
2. $0.4\overline{)99}$ Quotient: ________
3. $0.04\overline{)1.5}$ Quotient: ________

Let's Try It Together Use the standard algorithm for division to find the quotients. Stop dividing at the Thousandths place..

1. $1.9\overline{)9.956}$ Quotient: ________ `	**6.** $0.7\overline{)70}$ Quotient: ________
2. $7.3\overline{)3.431}$ Quotient: ________	**7.** $0.03\overline{)90}$ Quotient: ________
3. $0.04\overline{)0.51}$ Quotient: ________	**8.** $0.04\overline{)57.6}$ Quotient: ________
4. $0.05\overline{)1.43}$ Quotient: ________	**9.** $0.5\overline{)0.91}$ Quotient: ________
5. $0.5\overline{)44}$ Quotient: ________	**10.** $0.5\overline{)1.3}$ Quotient: ________

CONNECT

Error Analysis Evaluate the student's work below. Explain the error (or errors) the student made. Then, perform the division correctly to find the quotient.

Divide: $0.3\overline{)77.43}$

Student's work: 77.43 ÷ 0.3 will have the same quotient as 7.743 ÷ 3.

```
   2.581
3 ⟌7.743
   6
   17
   15
    24
    24
      3
      3
```

Photo Credit: Shutterstock.com

Check Your Understanding

Follow your teacher's instructions to complete this activity.

UNIT
6

Theme 2 | Mathematical Operations and Algebraic Thinking

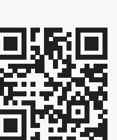
Unit 6 Numerical Expressions and Patterns

Photo Credit: Anton Petrus / Shutterstock.com

Video

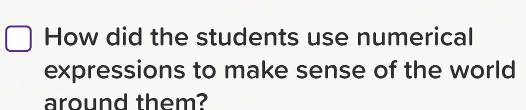
Calculating Meals

Unit Video Questions



Quick Code
egm5129

The Unit 6 Opener Video, Calculating Meals, explores math around Egypt through numerical expressions and patterns. In this unit, you will learn to apply the order of operations to evaluate numerical expressions. You will use expressions to identify and extend numerical patterns.



- ☐ How did the students use numerical expressions to make sense of the world around them?
- ☐ What did the students discover about numerical expressions?



LESSON 1

Ordering of Mathematical Operations



Learning Target

- I can use the **order of operations** to evaluate expressions with whole numbers and decimals.

ACCESS

Fill in the Blank Record the missing value to complete each equation.

1. $45.9 - ______ = 32.57$
2. $______ \div 9.2 = 4.8$
3. $105.7 + ______ = 213.2$
4. $202.83 - 40.2 \times 2 - 0.33 \div 0.01 + 67.05 = ______$

Photo Credit: agsaz / Shutterstock.com

BUILD

Order Matters Use the order of operations to evaluate each expression.

Basic Order of Operations

1. Multiply or divide from left to right.
2. Add or subtract from left to right.

1. $82.43 \times 3.1 + 4.05 \div 0.01 - 2.5$
2. $56.5 \times 2.3 - 15 + 12.7$
3. $597.8 \div 6.1 + 13 \times 1.7$
4. $90.7 + 116.6 \times 0.1 \times 2 - 20$
5. $1{,}403.5 - 12.3 \div 0.01 + 9.8$

One Step at a Time Evaluate each expression, one step at a time, with your class or group. Be sure to rewrite the expression after each step.

1. $145.42 - 7.11 \times 10 + 13.2$
2. $35 \times 0.1 + 89.14 \div 0.1$
3. $102.15 + 6 \div 1.2 - 34 \times 2.3$

CONNECT

The Right Route Ali drives a bus route through the city. His stops follow the order of operations for evaluating the expression.

$$300.53 - 11.04 \times 0.2 \div 0.01 + 13.07$$

STOP 1	STOP 2	STOP 3	STOP 4
A. 300.53 – 11.04	E. 2.208 ÷ 0.01	J. 57.898 ÷ 0.01	N. 5,789.8 + 13.07
B. 11.04 × 0.2	F. 0.2 ÷ 13.08	K. 220.8 + 13.07	P. 79.73 + 13.07
C. 0.2 ÷ 0.01	G. 289.49 × 0.2	L. 289.49 × 20	Q. 300.53 – 233.87
D. 0.01 + 13.07	H. 11.04 × 20	M. 300.53 – 220.8	R. 57.898 + 13.07

Record the letters of the correct stops along his route to show the steps for evaluating the expression.

1. Stop 1: ________

2. Stop 2: ________

3. Stop 3: ________

4. Stop 4: ________


Tour Bus



Check Your Understanding

Follow your teacher's instructions to complete this activity.

LESSON 2

Numerical Expressions with Parentheses



Learning Targets

- I can identify how grouping symbols affect the order of operations.
- I can evaluate an expression with grouping symbols.

ACCESS

Make It Smaller Work with a partner to describe how you could apply operations to the expressions so that they evaluate to the least possible value. You do not have to follow the standard order of operations.

1. $10 \times 4 - 3$
2. $15 \div 3 + 2$
3. $12 + 24 \div 4 + 8$
4. $34 \times 28 \div 2 + 5$

Photo Credit: agsaz / Shutterstock.com

BUILD

Grouping Symbols Evaluate the set of expressions. Pay attention to the grouping symbols and how they change the order in which the operations are performed.

Expanded Order of Operations

1. For operations within parentheses
    a. multiply or divide from left to right
    b. add or subtract from left to right
2. For operations outside parentheses
    a. multiply or divide from left to right
    b. add or subtract from left to right

Set A

1. $45.84 + 13.05 \div 5 + 20.32 - 1.14 \times 2.1$

2. $(45.84 + 13.05) \div 5 + 20.32 - 1.14 \times 2.1$

Grouping Symbols, Advanced Evaluate the set of expressions. Pay attention to the grouping symbols and how they change the order in which the operations are performed.

Advanced Order of Operations

1. For operations within parentheses
   a. multiply or divide from left to right
   b. add or subtract from left to right
2. For operations within brackets
   a. multiply or divide from left to right
   b. add or subtract from left to right
3. For operations outside of parentheses or brackets
   a. multiply or divide from left to right
   b. add or subtract from left to right

Set B

1. $30 \times 2.5 + 47.18 - 3.12 \div 0.1$

2. $30 \times (2.5 + 47.18 - 3.12 \div 0.1)$

How Many Values? Use grouping symbols to create as many expressions with different values as you can.

1. $29.2 + 43 \times 0.01 + 15 \div 0.1$

2. $158 \div 2 + 6 \times 10.5 - 5$

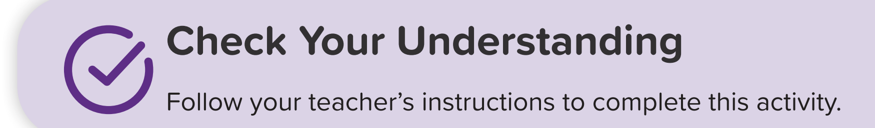
3. $57 - 11 \times 1.2 + 3.4 + 1.9 \div 10$

CONNECT

Place the Grouping Symbols Kamal placed grouping symbols in the expression. When he evaluated the expression, he found a value of 6.45.

What grouping symbols did he use? Where did he place them?

$15.25 \div 2 + 3 + 6.8 \div 2$



LESSON 3
Writing Expressions to Represent Scenarios



Learning Target

- I can write an expression to represent a written scenario.

ACCESS

With or Without Evaluate each set of expressions. Think about how and when the parentheses change the value of the expression.

1. $1.3 + 3.45 \times 8 - 2.02$

   $(1.3 + 3.45) \times 8 - 2.02$

2. $350 + 450.9 \div 2 + 23.7$

   $350 + (450.9 \div 2) + 23.7$

3. $64 \div 0.32 + 0.1 \times 3.2$

   $64 \div (0.32 + 0.1 \times 3.2)$

4. $50.6 \times 12 - 6.8 \div 0.2$

   $(50.6 \times 12) - 6.8 \div 0.2$

Photo Credit: agsaz / Shutterstock.com

BUILD

Writing Expressions For each problem, work with a partner to write an expression that matches the clues. Then, evaluate the expression.

1. Subtract 3.1 from 4.62. Then, multiply the result by 2.

2. Divide 93 by 0.3 and then add 114.7. After, divide the result by 5.

3. Add 30.4, 87, and 17.5. Then, subtract the result from 224.7. Multiply by 100.

4. Multiply 7.6 by 100. Next, subtract 34.3. Then, add 12.4. Last, divide the result by 0.1.

5. Find the difference between 10 and 9.27. Multiply by the sum of 54 and 46. Then, divide 1,168 by the result.

Expressions and Story Problems For each problem, write an expression that matches the scenario. Then, evaluate the expression.

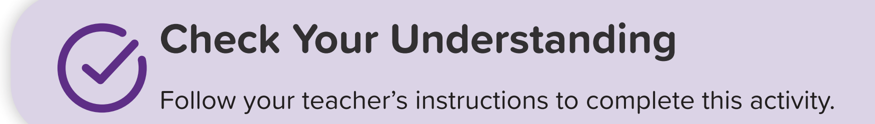
1. Kamel is saving money to buy a car. He currently has 1,000 LE. He begins working two jobs. At his first job, he saves 50 LE a week. At his second job, he saves 30 LE a week. He saves the money from his jobs for 4 weeks to add to his savings. How much does Kamel have saved at the end of the 4 weeks?

2. As part of his fitness training, Mounir cycles 38.7 kilometers in 2 hours. If he cycles at the same rate the entire time, how many meters does he cycle per minute?

3. Hoda is filling identical vases with water for flower arrangements at the florist. She starts with 15.75 liters and pours an equal amount into 16 vases. When she is finished, Hoda still has 3.75 L of water left. How much water is in each vase? Give your answer in liters.

CONNECT

Writing About Math Reflect on how the order of operations is used to represent real-world situations.



LESSON 4
Identifying Numerical Patterns



Learning Targets

- I can identify a **numerical pattern**.
- I can explain the **rule** for a numerical pattern.
- I can use letters to represent unknown quantities in a rule for a numerical pattern.

ACCESS

Tile Pattern Yaseen is laying floor tiles in the pattern shown. Each picture represents one stage of the pattern, and the pattern grows consistently between stages. Answer the questions about the pattern.

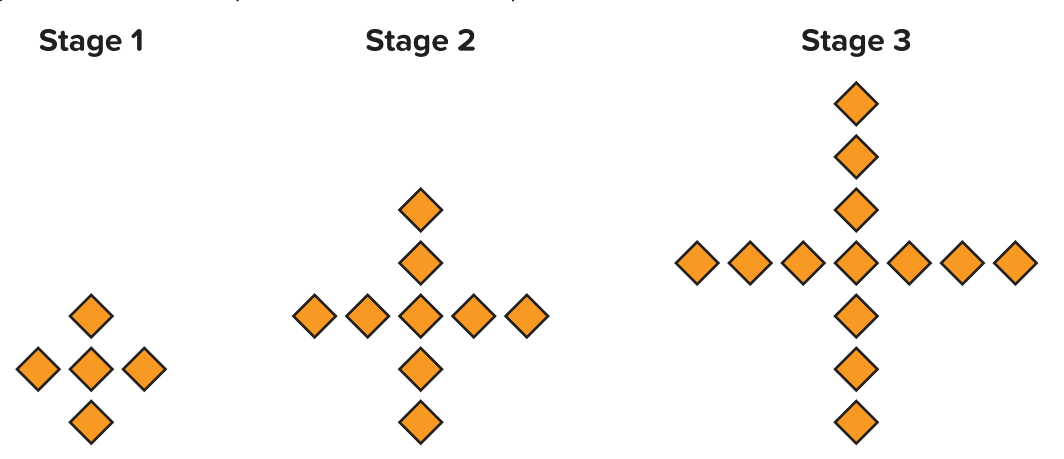


Photo Credit: agsaz / Shutterstock.com

Draw Stage 4 and Stage 5. How many tiles do you think will be in Stage 10? Explain how you came up with your answer.

BUILD

Numerical Patterns Look at each set of numbers and identify whether the numbers form a pattern. If yes, then identify the rule.

	Set	Pattern? (Y / N)	Rule
1.	5, 10, 20, 40, 80 . . .		
2.	3, 6, 9, 15, 21, 28 . . .		
3.	1.5, 3, 4.5, 6, 7.5 . . .		
4.	5, 3, 6, 1, 7, 5 . . .		
5.	1, 3, 9, 18, 54 . . .		
6.	85, 73, 61, 49, 37 . . .		

What's the Rule? Look at each table and determine the rule. Use a variable to write the rule.

1.

Input	Output
1	8
2	16
3	24
4	32
5	40

Rule: ____________________

2.

Input	Output
1	8
2	9
3	10
4	11

Rule: ____________________

3.

Input	Output
3	12
6	24
9	36
12	48

Rule: ______________________

4.

Input	Output
5	1
10	2
15	3
20	4
25	5

Rule: ______________________

5.

Number of Bicycles (Input)	Number of Wheels (Output)
1	2
2	4
3	6
4	8
5	10

Rule: ______________________

Challenge:

Input	Output
2	3
4	7
6	11
8	15
10	19

Rule: ______________________


Bicycle Wheels



CONNECT

Writing About Math Look at the pattern and the two students' work. Then, respond to the prompt.

Write a rule using a variable and explain your thinking.

Input	Output
28	4
35	5
42	6
49	7
56	8

Photo Credit: agsaz / Shutterstock.com

Yahia's Work

Rule: $n \times 7$

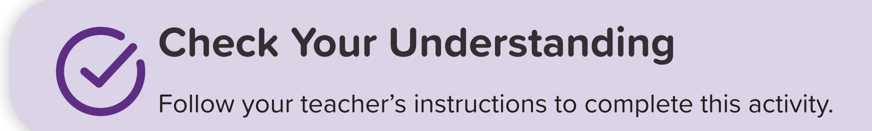
I think the rule is multiply by 7 because $4 \times 7 = 28$ and $5 \times 7 = 35$ and it works for each pair.

Walid's Work

Rule: $n \div 7$

I think the rule is divide by 7 because $28 \div 7 = 4$ and $35 \div 7 = 5$ and it works for each pair.

Which student is correct? Explain how you know your answer is correct.



Check Your Understanding

Follow your teacher's instructions to complete this activity.